



A Publication of Grove Enterprises, Inc.

Monitoring Times®

Vol. 15, No. 8
August 1996

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Communications
Source

Bringing Home The National Weather Service



- **MT Reviews Drake SW-1**
- **Air Force Goes to Zulu Plan**
- **Giant List of Fast Food Freqs**

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 - Two line character LCD displays Frequency and either All Mode Decoding (CTCSS, DCS, DTMF), LTR-Trunking, Relative Signal Strength, Latitude and Longitude, or FM Deviation with automatic backlight
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CTCSS Mode

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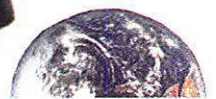
DCS Mode

461.725 MHz
DTMF: 8003275912

DTMF Mode

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- LTR-Trunking Mode



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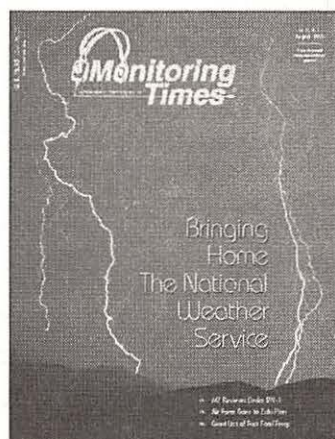
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*Cover Story*

Wireless Weather Information Network

By Ken Reitz

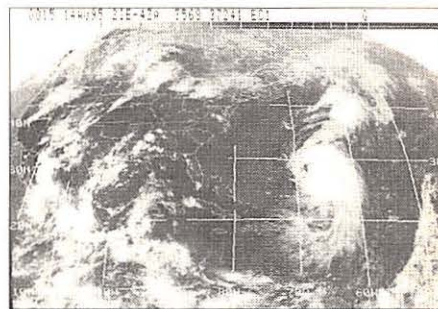
One dramatic way to import high-technology into your home computer is to access the same datastream used by the National Weather Service. The Emergency Managers Weather Information Network (EMWIN) is available by several different means, depending upon your location and type of equipment. Once you're connected, though, the sky's the limit! The story begins on page 9.

Cover photo copyright 1993 Warren Faidley/Weatherstock.

HF Fax on a Shoestring 13

By Brian Webb

If you already have a computer and a shortwave receiver with single sideband reception, the acquisition of JV-FAX software and construction of a simple \$7 circuit is all you need to view stunning weather facsimile transmissions. If you like the idea of the shoestring investment, but are deterred by the do-it-yourself approach, Webb walks you through it.



Scanning Galveston Island 20

By John Frazier

This city on an island is a popular vacation and retirement community, providing plenty of activity for an avid scanner listener. Frazier gives good advice for any visitor to a new location on how to get up and scanning in the shortest possible time.



Fast Food Smorgasbord 22

By Bob Grove

If you're DXing these frequencies, a good catch is measured in feet rather than miles! Bob Grove, together with Bob Eisner and several others, has put together the largest list we've seen of frequencies used for two-way communications by the nation's fast food chains.

Broadcasting Bedfellows 25

By Richard A. Seifert

Drake has been in the forefront more than once when it comes to designing a non-intimidating shortwave receiver for the beginner. Their first effort was the SW-4A, custom-designed to be marketed to the audience of Radio New York Worldwide. That's what this tale is about.

For a more modern story, turn the page.



Reviews:



"How can an everyday guy justify spending a thousand bucks on a radio?" asks sales. "How about offering an alternative?...a receiver that offers worthy performance at a competitive price."

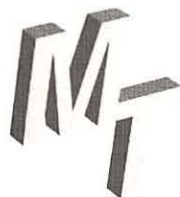
"You mean kind of a 'volksradio'? A good basic circuit in a decent cabinet, with none of the frills?" says engineering. And so they did, and you can read the rest of the story on the Drake SW1 in Magne Tests.

In other reviews this month, Scanning Equipment's Bob Parnass talks about audio recording for unattended monitoring, featuring a look under the hood of BMI's Nitellogger. Meanwhile, Bob Grove struggles with assembly of the GAP "Titan DX," a 3.5-30 MHz vertical with no radials, grounds, or guy wires. He pronounces the effort worth it, on page 97.

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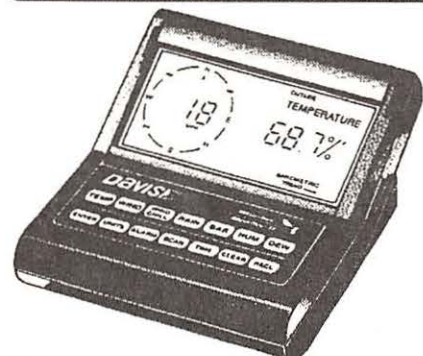
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The Promises of Fall

I welcome August with a mixture of regret for the last days of summer, and anticipation of the fall, which should bring—if Jacques d'Avignon's calculations are correct—not only a pick-up in reception due to the usual change in seasonal conditions, but also the beginning of the new solar cycle. It also means the October Grove Communications Expo is almost upon us—which is also an energizing pick-me-up.

It's difficult to see how RCMA's closure (assuming no last-minute rescue is forthcoming—see obit in What's New?) could be connected to sunspots, but the new cycle will be none too soon if Stewart MacKenzie's forecast turns out to be correct. Stewart, who is General Manager of the American SW Listeners Club, wrote in response to the on-going discussion of editorial direction (computers? internet? personal communications? radio past, present, and future?).

"Even though magazines like *MT* may take away some members from radio clubs, I believe, from my past experiences in the hobby since 1954, that the *sunspots* have more power over a club's membership rolls than magazines do. Each time the sunspot count drops to a minimum, we lose members. When they go up we gain members till the sunspot cycle peaks. The only time this changes is when a war breaks out somewhere on the planet and everyone wants to tune in the action.

"Due to the above, a number of clubs have closed down in the US and overseas. When the sunspots are high, you also see a rash of CB magazines come on the scene, and when the cycle ends, they go away till the next high cycle.

"According to what I have read, this upcoming sunspot cycle is going to be the highest one to date. This makes the year 2002 AD a most promising one for our hobby. I hope that ASWLC will be around to celebrate the event.

"I want to thank the folks at *MT* for the exposure for the ASWLC via the Club Circuit, and hope that the column will continue. We hope to become involved in the GroveLink in the near future."

Stewart's final reference is to Grove Enterprises' offer to provide free space on our internet server to nonprofit radio, satellite, or astronomy related clubs. We are pleased that a few groups have taken advantage of this additional support to the hobby. You can see who has homepages by checking the



"... My "Seen all Hurricanes" certificate has just arrived!! ..."

<http://www.grove.net:80/docs/localpages.html> location. GroveLink also currently hosts the World Utility Club (WUN) and *Cumbre DX* electronic newsletters.

Don't Give up on Scanning

"In every issue of *MT* various readers complain that their favorite public safety agency has gone to a trunked system and/or switched over to a digital system, thus making their favorite pastime a thing of the past. Many of these readers appear to blame the various departments and appear to have given up on the hobby because of the frustration.

"We cannot solely blame our local governments: [we can blame] the overwhelming rise of crime which has inspired an increased need for security for law enforcement personnel; the media, which has continued negative reporting on scanners (and the people who use them); and new technology, which has affected almost everything in our lives — why should it not affect the communications industry as well?

"While there are maybe hints, tips, and tricks to monitoring a trunked system, let's face it: the people using the trunked systems spend more money with the major communication manufacturers, so that is where the priorities of the manufacturers reside. This also allows the manufacturers to ... sell technology that probably will always be steps ahead of any scanner manufacturer.

"As with anything in life, things will change. Hopefully scanner manufacturers will soon employ some new technology to [benefit] all of us. If we all throw away our scanners now and give up, so will scanner manufacturers. Why put money into developing products, when the people who wanted them in the first place found other interests in

With all the weather tools at your disposal in this issue of MT, you can be like the chap in this cartoon by J. Worthington of North Wales, UK.

life to spend money on?

"Look back twenty years ago; the thought at that time of a programmable scanner was merely one of those items on our wish list. It will take a great deal of time and money to switch this entire country over to tighter channel spacing, digital technology, and trunked radio systems. Don't give up; put your headphones on and search around for something new to monitor until that new piece of equipment on your wish list becomes a reality."

—Lou Olcsy - East Brunswick, NJ

Lou, I think you must have been talking to Bill Edwards, who wrote this month's "Radio Reflections." Like you, he's very philosophical about the process of progress.

In reference to the June "Closing Comments" on the State of the Union, "I feel that somehow the consumer got left out of the equation. It would appear that in the world of scanners the consumer is definitely not getting a fair shake. This field is dominated by one company (Uniden). Technology is being passed along 'piecemeal' to the consumers in order to ensure that the buyer must continually upgrade, or pay for modifications/improvements after paying \$600 for his or her new scanner.

"We know of the difficulties in achieving good dynamic range when using semiconductor front ends. As Bob himself points out, no scanner is particularly good in this regard, and that is why you need attenuators and amplifiers.

"It is possible we are going to get a little help from our European friends. The EEC has introduced strict EMC regulations which came into effect Jan 1, 1996. However, the AR8000 has not yet been approved as meeting these

(Continued on Page 104)

THE WORLD'S MOST ADVANCED SHORTWAVE RECEIVER



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Radio to the Rescue!

Cellular phones turn up in the most unusual places. When a 27 year old woman in Japan told her boyfriend that she wanted to break up with him, the boyfriend locked the woman in the trunk of his car.

After struggling unsuccessfully for hours to get out while the boyfriend drove around, she remembered the cellular phone in her pocket book. She pulled it out, dialed up a friend and told her that she was in the trunk of a car somewhere in the city of Hamamatsu.

The car was eventually found in a parking lot. Police arrested the boyfriend. The anonymous reader who submitted this had to wonder if the phone was an 800 MHz trunked system. Booo.

Family Frequencies

The FCC has officially established the new low-powered, unlicensed radio service called the Family Radio Service. The service was established in response to a petition filed by the Radio Shack division of Tandy Corporation. The object of the new service is to provide small groups of people with affordable and convenient means of direct, short-range (up to one-half mile) two-way voice communications. The channel plan is as follows:

Channel 1 462.5625	Channel 8 467.5625
Channel 2 462.5875	Channel 9 467.5875
Channel 3 462.6125	Channel 10 467.6125
Channel 4 462.6375	Channel 11 467.6375
Channel 5 462.662	Channel 12 467.6625
Channel 6 462.6875	Channel 13 467.6875
Channel 7 462.7125	Channel 14 467.7125

Channels one through seven are current GMRS frequencies and channels 8 through 14 are positioned between the current GMRS repeater input channels.

X Files on AM

Drivers who find themselves on Hollywood's famous Sunset Strip can now tune their radios to an "X Files" billboard.

Fox TV, which produces the TV show, has attached a 100-milliwatt AM transmitter to the billboard, broadcasting a short loop of soundbites, music and "hidden messages," culled from the show's soundtrack. It is reported that the signal, on 1610 AM, can be heard for a half-mile radius.

"We thought there was something very 'X-Filian' about taking over underground airwaves not regulated by the FCC to spread the show's messages of 'the truth is out there' and 'trust no one,'" says Cindy Hauser, Fox's senior vice president for print, special projects and on-line entertainment.

Chilly Reception

American scientists at work in the 50-degrees-below-zero-celsius Antarctica now feel a little more "connected." The U.S. has installed the most extensive TV system in what is perhaps the most isolated spot on the planet. While the base at McMurdo has always had some limited TV broadcast over low-powered transmitters, National Science Foundation scientists discovered that they could pull signals from the Armed Forces Radio and Television Service.

Already, TV has brought changes to McMurdo culture. "The clubs are awfully dead and no one's out hiking," said one contractor who returned to the base after a year's absence. "I guess they're all watching TV."

The British Antarctic Survey scoffs quietly at the Americans. The UK staff has no plans for regular TV service. "Instead, our science and support staff enjoy watching videos in their leisure time and frequently listen to the BBC world service on HF radios," says BAS spokeswoman Linda Capper.

The French, says Christopher Terrasse, spokesman for the French Institute for Polar Research and Technology, prefer tapes on Antarctica. "Something about penguins, for example."

TV Threat

In the wake of at least one liquor store's decision to advertise on TV, the FBI announced that it received an anonymous letter

"Hey, kids, it's your friend, Oscar, again with the breakfast of champions..."



threatening to bomb any station that airs the commercials. The letter blames broadcasters for the fact that "hundreds" of children are killed each year in accidents involving alcohol. The letter also threatens to target breweries and delivery trucks.

The New FCC

The FCC continues to downsize. By the time you read this, the FCC will have closed more than half of its field offices, downsizing from 35 to just 16. The number of employees will also drop from 374 to 254.

The FCC is currently trying to shift many of its functions to the private sector, specifically complaints such as interference. Instead, the FCC wants to get out into the field more often to visit radio stations.

Of particular interest is EEO. The FCC will want to see detailed records on each job opening, contacts with recruitment sources, and the number of minorities and women that apply for and are interviewed for each job opening.

CBer Tangles with Law

A Florida CBer with a 250 watt amplifier has run afoul of the law — because of his mouth. According to the *St. Petersburg Times*, Dean Schumacher was hauled off to jail, his home searched, and about \$575 in radio equipment seized. During the search, police turned up a small quantity of marijuana. He was charged with disorderly conduct and possession.

Patricia Knepper, a neighbor of Schumacher, said she endured constant interruptions on her radio and telephone from the CBer. Much of it was profane and sexually explicit, she says. Knepper says she telephoned the FCC, but the FCC doesn't remember the call. In any case, says an FCC spokesman, such complaints are so common that the FCC doesn't even investigate unless it receives a written complaint.

She eventually went to police who overheard the foul language. Schumacher is unapologetic. "Whether I tell you to go f— yourself or whether I tell you hello, it doesn't matter. That's the First Amendment."

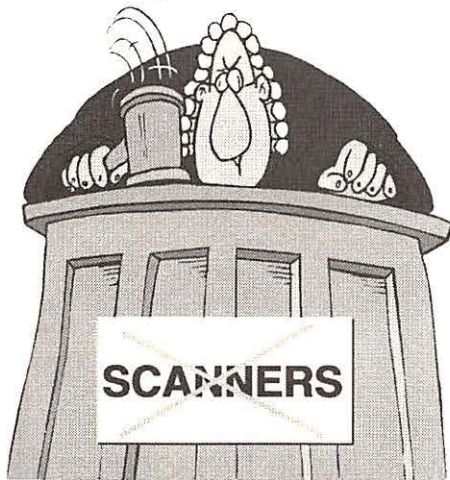
The police are holding Schumacher's equipment pending a decision by the state attorney general on whether to prosecute the CBer on disorderly conduct charges. Meanwhile, he's back on the air using a rig loaned to him by a friend.

Jammer Loses License for Life

The FCC threw the book at a ham operator. Charged with intentional interference, Irvin J. Foret of Metairie, Louisiana, has been fined \$500. He also must submit his Technician plus license for cancellation and refrain from applying for any FCC license for the rest of his life. He is also forbidden to participate in any ham or CB communications, even as a third party and has forfeited his rights to seek reconsideration, review, appeal or challenge of the settlement.

Foret, KB5UJD, was monitored during April initiating transmissions described by FCC engineers as "willful or malicious interference to the communications of other amateur radio stations." Some of Foret's transmissions were termed "obscene or indecent" and included music.

Scanner Rogues in Britain



The lives of the royal family and senior politicians are being put at risk by scanner listeners in the United Kingdom, or so says the *Sunday Times*. At issue is the impending publication of a 100 page directory of frequencies, including those used by specialist police agencies such as the royal and diplomatic protection squads. Other frequencies listed included those for anti-terrorist squads, and nuclear and biological weapons centers.

The list is to be published by the Professional Radio Operator Monitoring Association (PROMA) and put on the internet.

It is legal to own a scanner in England but it is forbidden to use it to eavesdrop on channels used by the military or emergency services. Officials at the Radio Communications Agency have indicated that the publication of the list is not, in itself, an illegal act.

In Passing ...

We recently learned of the death of two colleagues. Jerry Freeman was the Engineer-In-Chief of the Norfolk FCC field office. He was extraordinarily dedicated to enforcement, leading many raids on CB linear amplifier manufacturers and dealers, as well as uncertified computer equipment. An active ham and reliable informational source to *MT*, Jerry will be sorely missed by the communications community.

Ray Cole was an inveterate experimenter with seismic electromagnetic events; an article published several years ago in *MT* detailed his observations regarding apparent frequency shifts among medium wave broadcasters prior to earthquakes. Ray's empirical approach to collecting evidence to corroborate his theories were refreshing, and his cooperative attitude in sharing his findings were appreciated.

"Communications" is written by Larry Miller with help from Rachel Baughn and the following members of the *Monitoring Times* Monitoring Team: Dave Alpert, New York, NY; Alex Blaha, Joliet, IL; Harry Baughn, Brasstown, NC; Bob Coburn, Londerry, NH; Andrei Doles, Wonder Lake, IL; Lou Gabrielson, Amityville, NY; Bob Grove, Brasstown, NC; Jeffrey Jones, CA; George, Kaelin, Louisville, KY; Maryanne Kehoe, Atlanta, GA; Kevin John Klein, Appleton, WI; R. McBride, Philadelphia, PA; Paul McDonough, Somerville, MA; Dave Page, Brewer, NE; Ira Paul, Royal Oak, MI; Fred Pierce, Sherman Oaks, CA; Keith Russell, Kansas City, MO; Robert Stewart, Fort Worth, TX; Robt Thomas, Bridgeport, CT; James Tunnell, El Sobrante, CA; Dave Simpson,

UK; Richard Sklar, Seattle WA, and Joe Wilkenson, Atlanta, GA. We also consulted the following publications and organizations and list their names in appreciation: *ARRL Letter*, *Dispatch Monthly*, *National Scanning*, *Radio World*, *World Radio* and the *W5YI Report*.

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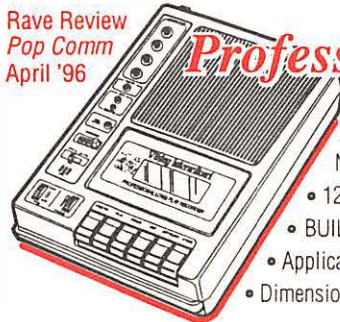


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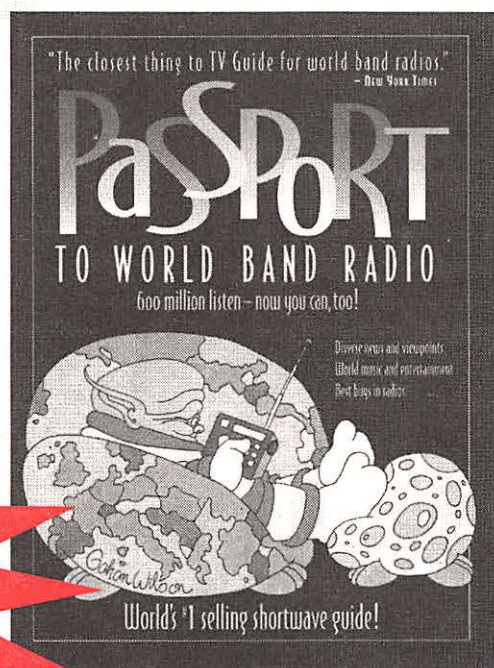
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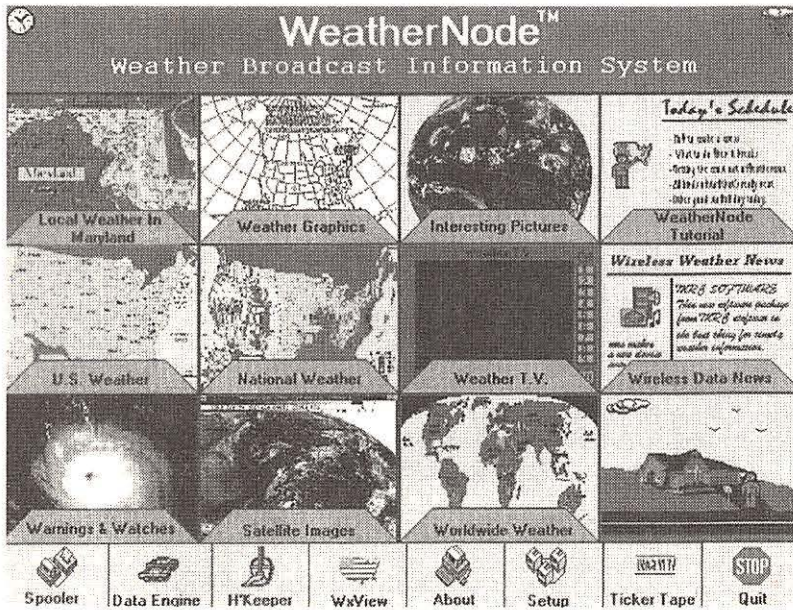
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Offer ends August 31, 1996!

Order by this date and by mid-September you'll receive the 1997 Edition of the *Passport to World Band Radio*. After that, the price will be increased to \$19.95 plus \$6.00 shipping. You save \$9.00 in all by ordering now!

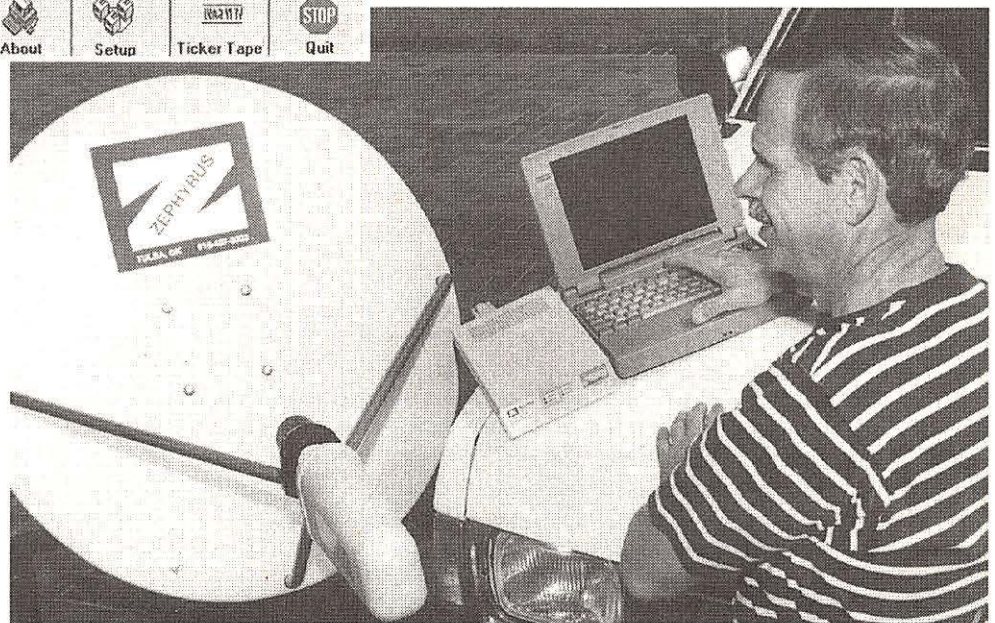
*Foreign shipping: Foreign surface printed mail, add \$4.50; Air Mail for printed matter for Canada, add \$6.00 (\$7.50 elsewhere)

Wireless Weather Information Network



What would you like to track? It's all here!

Phillip Weigant, National Field Coordinator for EMWIN, operates a Zephyrus data system in the field. The complete system is a small Ku band dish and the data receiver. Here Weigant uses his laptop to complete this highly portable system. (Photo by John David Heckel courtesy Zephyrus Electronics, Ltd.)



Bringing the National Weather Service to Your PC

By
Ken Reitz
KS4ZR

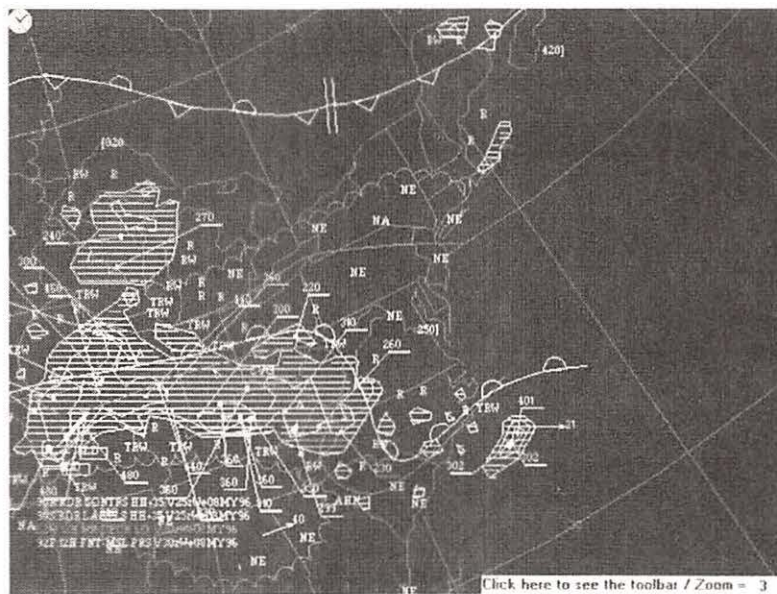
How many times have you tuned in to The Weather Channel only to see an unending stream of commercials for video tapes of weather fiascos and tips on waterproofing your house? Half an hour later you're finally getting to the report you're interested in, but the presenter is always standing in front of your part of the country. If you're hungry for more than what The Weather Channel gives you but don't want to shell out thousands for weather satellite receiving equipment, the Emergency Managers Weather Information Network (EMWIN) is for you.

Originally known as Wireless Weather Information Network (WWIN), EMWIN was started in 1994 as the brainchild of Jim Doherty, N3KHJ, EMWIN Project Manager in the Silver Spring, Maryland, office of the National Weather Service. Doherty, an electrical engineer and computer scientist, was asked to put together a weather information data stream which could be set up in Federal offices in nearby Washington, D.C. so that tourists could see what the weather was like back home. It was a fairly crude set-up using touch screens, but it found favor with officials and tourists alike.

Realizing that he was transmitting far more information than was being used, he sought to have a modem built which, when used with a modestly outfitted personal computer, could provide an impressive stream of data nearly identical to information received at Weather Service Forecast Offices.

■ The Maryland Radio Center Connection

Doherty went to his friend and fellow ham Jerry Johnson, WA3WZF, of Maryland Radio Center (MRC), and asked him to design a modem which would allow personal computers to capture the myriad forecasts, climatological data, and satellite imagery collected by the National Weather Service (NWS) and disseminated to the entire U.S. What Johnson came up with was a small interface called the



NWS maps let you be your own weather forecaster.

WxDemo™. One end of the WxDemo plugs into a Com Port on your computer; the other end plugs into one of three sources: (1) a scanner or weather radio receiver, (2) the audio output of a special Weather Info-Net Receiver tuned to an FM Squared Ku band transmission, or (3) the audio output of a carrier on the GOES 8/9 weather satellite.

After perfecting the demodulator design and getting the software glitches taken care of, Doherty and Johnson began to see a wide range of applications. The first was a project in which EMWIN systems were used in District of Columbia public schools. Teachers and students alike were excited about the project.

By January of this year EMWIN was undergoing a full scale test in the Silver Spring area. In fact, two MT readers, Mike Agner,

KA3JJZ, and David Alpert, both sent E-mail messages within days of each other alerting us to the existence of EMWIN. Finally, in May of this year—one year after the operational beginning of EMWIN—the service could be found in these locations:

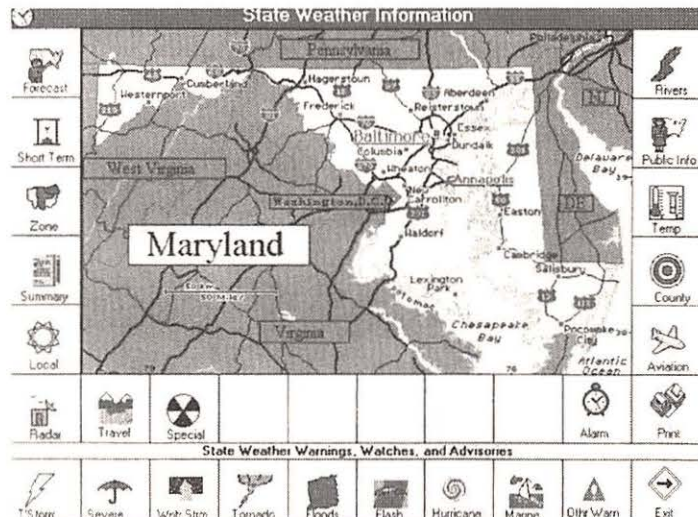
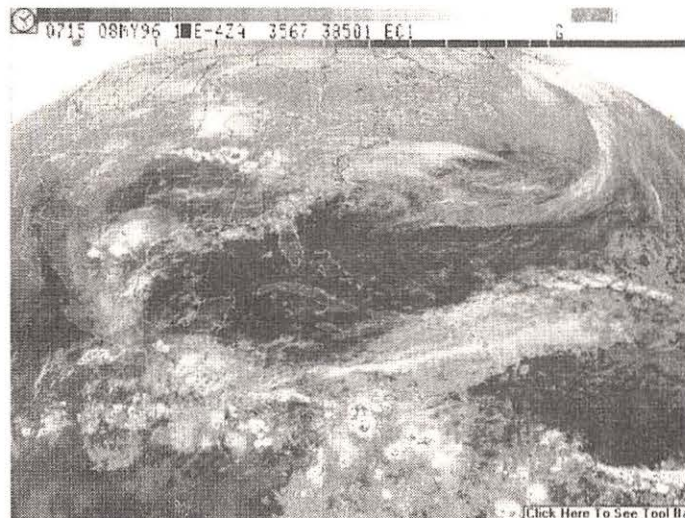
- on a number of VHF-FM transmitters around the country;
- on a subcarrier of the digital PBS service on the Ku band side of Telstar 401;
- on an FM Squared subcarrier on the Ku side of Galaxy 4; and
- on a subcarrier on the GOES 8 geostationary weather satellite.

■ How To Receive EMWIN

There are only three VHF-FM transmissions currently broadcasting EMWIN data, though it is expected that this number will mushroom shortly. In Silver Spring, Maryland, tune 163.350 MHz.; in Norman, Oklahoma, 169.025 MHz.; and in Tulsa, Oklahoma, 165.0125 MHz.

EMWIN data is also being broadcast on an experimental basis on the PBS digital Ku band service on Telstar 401. Unfortunately, reception for this method requires a General Instrument Digicipher receiver, which is not available to consumers at this time.

Zephyrus Electronics, Ltd. of Tulsa, Oklahoma, is a commercial venture which provides weather data to private and commercial interests. Ed Covington, Zephyrus' founder,



Do you want the global picture or the local? With the EMWIN system, it's your choice.

says that, "...bundling MRC software with Zephyrus hardware was a natural. We were able to do a 24 hour turn-around when we hooked up with Maryland Radio Center."

Zephyrus sells complete EMWIN packages for reception of their FM Squared data service on Galaxy 4 Ku band (see photo). The complete system, using a Ku band dish, LNB/feed horn, and data receiver is extremely compact. This system is designed to literally work out in the field powered by a belt-pack battery. The receiver uses a variable-pitch tone coupled with an adjustable meter for easy peaking of the signal strength. Zephyrus also sells a small EMWIN data receiver to use with a VHF-FM configuration. In addition, Zephyrus has available a complete GOES/Weather Info-Net Receiver™.

■ How It Works

The main purpose of EMWIN is to provide the public with severe weather warnings, but, since such severe weather is a relatively rare event, the rest of the transmission time is given over to broadcasting routine weather reports, graphics, and satellite imagery. Weather Service Forecast Offices (WSFO) receive reports from the nation's many Weather Service Offices (WSO) and are all interconnected via computers. Graphics from the National Meteorological Center (NMC) are added to the data, along with hourly reports from GTE's WeatherWire. Satellite imagery from GOES is added to the mix, and the whole thing is sent on a regular schedule on the EMWIN data stream.

At the consumer's home, the data stream is received via any of the above-mentioned methods and demodulated. The data is monitored by a software program called "The Data Engine" which processes the information, keeps what you ask it to, dumps the rest, and makes the data available for your convenience. The program is designed to run "in the background" on your computer so that you can use your computer for other purposes until you have time to review the data. Since it is fed at 1200 baud (a very slow rate these days) it takes quite a while for the data to mount in the hard drive.

■ How To Use EMWIN

With the program running in the background you can set audio alarms which sound when information you've asked for comes in. You can keep abreast of such information as severe weather warnings in any state you choose, while you use your computer for other tasks. The Data Engine checks the alarm

High Seas Forecast

FZPN01 KWBC 081615
HSFEP1

HIGH SEAS FORECAST
NATIONAL WEATHER SERVICE WASHINGTON DC/TPC MIAMI FL
MARINE PREDICTION CENTER/MFB 1700 UTC 08 MAY 1996
SUPERSEDED BY NEXT ISSUANCE IN 6 HOURS


SECURITE
PACIFIC N OF 30N AND E OF A LINE FROM THE BERING STRAIT TO 160E.
SYNOPSIS VALID 1200 UTC 08 MAY. FORECAST VALID 0000 UTC 10 MAY.


WARNINGS


GALE 53N 169E 990 MB MOVING N 10 KT THEN NEARLY STATIONARY.
WINDS 25 TO 35 KT SEAS 10 TO 18 FT WITHIN 400 NM OF CENTER AND
FROM 42N TO 60N BETWEEN 171W AND 179E. FORECAST GALE 55N 170E
995 MB. FORECAST WINDS 25 TO 35 KT SEAS 10 TO 17 FT WITHIN 240
NM SW SEMICIRCLE.


SYNOPSIS AND FORECAST


LOW 31N 158W 1014 MB DRIFTING SE WITH WINDS TO 25 KT SEAS TO 10



Wx Summary



Temp. Precip.



Crop Reports



Floods



Hurricane



High Seas


E'quakes


Erase


Alarm


Print


Exit

All the major services of the NWS are accessible. Going ocean fishing? Check out the High Seas Forecast.

list each time it receives complete data blocks. If it sees one you've asked for, the alarm is triggered and you can rush to the computer to see what's up.

Detailed weather information for any state in the Union can be called up, and the program allows you to look at forecasts and weather conditions for individual counties or metropolitan areas. You can also look at a 5X magnified representation of the most current weather radar for the area. Aviation weather, county forecasts, and winter storm warnings for your area are just a few of the items you will be able to access with the program.

Using EMWIN you can call up the national screen (which includes Alaska and Hawaii)

and have precipitation plus the high and low temperatures displayed; crop reports can also be shown depicting rain and drought information and projected crop yields. Satellite images are also captured, stored, and, with the help of the software, a slide show of consecutive images can be put together to show movement of weather systems—just like on The Weather Channel.

When time is available, the NWS transmits interesting pictures of weather-related events or dramatic satellite imagery, such as a category 5 hurricane. As with other categories, these images can all be saved to disk or printed for later use.

There is a provision for a feature called

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Weather TV, which will allow displays of short video and audio clips of weather events to be captured. You will need Video for Windows to use this feature. At present the NWS is not sending this information, but should be doing so eventually. Meanwhile, you may view Weather TV clips on the MRC bulletin board listed at the end of this article.

■ But Wait, There's More

As stated in EMWIN material:

...The (EMWIN) system contains many categories of weather data products, with over 6,500 unique products...The current...data stream contains all generally available public products from the NWS Telecommunications Gateway, including the following categories:

- Analyses: Environmental/air pollution, hydrological/marine, surface, misc.
- Climatic Products: Daily surface, monthly surface, misc.
- Forecasts: Aerodrome, aviation area, extended, flash flood guidance, headwater guidance hydrological, iceberg, local/area, misc, public recreation/travelers, river, shipping area
- Graphics: AFOS charts and map overlays
- Images: GOES satellite
- Misc: Civil Emergency messages, public weather statements
- Reports: radar, seismic, synoptic, hydrological river, drifting buoy, ice
- Severe Weather: warnings, summaries, statements, advisories
- Warnings: Tsunami/tide, tornado, river flood, lakeshore/marine, typhoon/ hurricane, marine/coastal flood, severe thunderstorms...

This is a huge amount of information—no wonder they advise you to run the program and feed the data all day!

■ What You'll Need For Reception

For VHF-FM reception you'll need to be within at least 30-60 miles (depending on your antenna) of the transmitter sites detailed above. For GOES satellite reception you'll need at least a 3 or 4 foot diameter dish, plus a 1.7 GHz LNB. For Ku band reception you'll need the Zephyrus gear.

Your computer needs to be a PC compatible 386DX40 or better, using Microsoft Windows™ 3.1 or later; 4 MB or more RAM; 10 or more MB of hard drive disk space; SVGA 640 x 480, 256 color driver, one COM serial port; a mouse; a 3-1/2" floppy; MS-DOS 5.0 or later. And, of course, you'll need the Weathernode software and the WxDemod demodulator.

Tornado Watches, Warnings, and Advisories

WFUS1 KATL 072150
TORATL
6AC195-072230-

BULLETIN - EAS ACTIVATION REQUESTED
TORNADO WARNING
NATIONAL WEATHER SERVICE PEACHTREE CITY GA
559 PM EDT TUE MAY 7 1996






THE NATIONAL WEATHER SERVICE IN PEACHTREE CITY HAS ISSUED A TORNADO WARNING EFFECTIVE UNTIL 630 PM EDT FOR PEOPLE IN THE FOLLOWING LOCATION...

IN NORTHEAST GEORGIA


...WESTERN MADISON COUNTY

AT 555 PM EDT NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A TORNADO 5 MILES SOUTHWEST OF POCATALIGO MOVING EAST AT 10 MPH. THIS SHOULD TAKE THE STORM NEAR DANIELSVILLE AROUND 615 PM.

IF YOU ARE CAUGHT OUTSIDE...SEEK SHELTER IN A NEARBY REINFORCED BUILDING. AS A LAST RESORT...SEEK SHELTER IN A CULVERT...DITCH OR LOW SPOT AND COVER YOUR HEAD WITH YOUR HANDS.


Tornado

Thunder Storm

Winter Storm

Flood

Flash Flood


Watch Areas


Special


Hurricane


Marine


Wx Stmt


Others


All


Erase


Alarm


Print


Exit

Especially in those areas where Weather Radio does not reach, the weather advisories could be a lifesaver.

■ The Bottom Line

EMWIN and the Weathernode system is a triumph of data and hardware. As weather visionary Doherty says, "...it started out as just something to help people get information...it's a classic case of reinventing technology and doing more with less."

With help from the private sector and without busting the already beleaguered NWS budget, Doherty and Johnson have created a monster of the most useful kind. Finally, information heretofore available only to corporations with deep pockets is literally at the fingertips of the average American citizen. When it comes to the NWS, with EMWIN the taxpayer is getting every dime of his taxes back.

The applications for EMWIN in the realm of education ought to be obvious; every school system in the United States should be taking advantage of the educational opportunities offered with this system. The cost per benefit is microscopic.

While there is no charge for the use of the data stream, here's how the equipment costs break down: The MRC Weathernode software and demodulator cost \$139.95 plus \$5 shipping (Maryland residents add 5% for sales tax). This, together with your computer and a scanner is all you'll need if you are within reception range of a weather data transmitter. Price for the Zephyrus Ku band receiving

system, less dish, is \$290. This entire EMWIN system is just in its infancy and products are currently being designed and introduced. Contact the sources listed at the end of this article for the very latest price and product information.

■ For More Information

If you have internet access there is a wealth of information for you regarding EMWIN. To get an idea of the scope of this service, those connected to the Web can tune into a live internet based system similar to EMWIN by typing: <http://iwin.nws.noaa.gov>. The Web site for Zephyrus is: <http://www.big-z.com>. Maryland Radio Center is at: <http://www.weathernode.com>. Their Weathernode BBS is at (301) 725-8307. EMWIN's home page is at: <http://www.nws.noaa.gov/oso/oso1/oso12/document/emwin.html>.

Jim Doherty can be reached at NWS EMWIN Project, National Weather Service, W/OSO12, 1325 East-West Highway, SSMC2 #16330, Silver Spring, Maryland 29010. Phone: 301-713-0191 x193. FAX: 301-713-1128.

Maryland Radio Center is at 8576 Laureldale Drive, Laurel, Maryland 20724. Phone: 301-725-1212 FAX: 301-725-1198.

Zephyrus Electronics, Ltd. is at 171 S. 122 E. Avenue, Tulsa, Oklahoma 74128-2405. Phone: 918-437-3333. FAX: 918-438-7322.

HF Fax on a Shoestring

*Most SWLs
with a PC
can see the
world for
something
less than \$20*

By Brian Webb

Anyone who's done much shortwave listening has heard them: odd, repetitive sounds similar to a dragging chain or squeaking wheel. These noises are the hallmark of facsimile (fax) transmissions. Every day numerous HF stations broadcast an interesting variety of weather charts, satellite pictures, and news photos.

HF fax reception has intrigued many shortwave enthusiasts, but they've been put off by the price. Most commercial HF fax demodulators cost at least \$300, with some units priced at well over \$1,000. Luckily, there's an inexpensive alternative.

For less than \$20, most SWLs with an HF receiver and an IBM compatible PC can receive shortwave fax transmissions. It's done with a simple-to-build demodulator and some

sophisticated free software. Don't let the low cost of this project fool you; although the cost is next to nothing, you get fax reception equal to or better than the expensive commercial units. Sometimes, the results can be impressive, as shown in Figure 1.

■ Receiving System

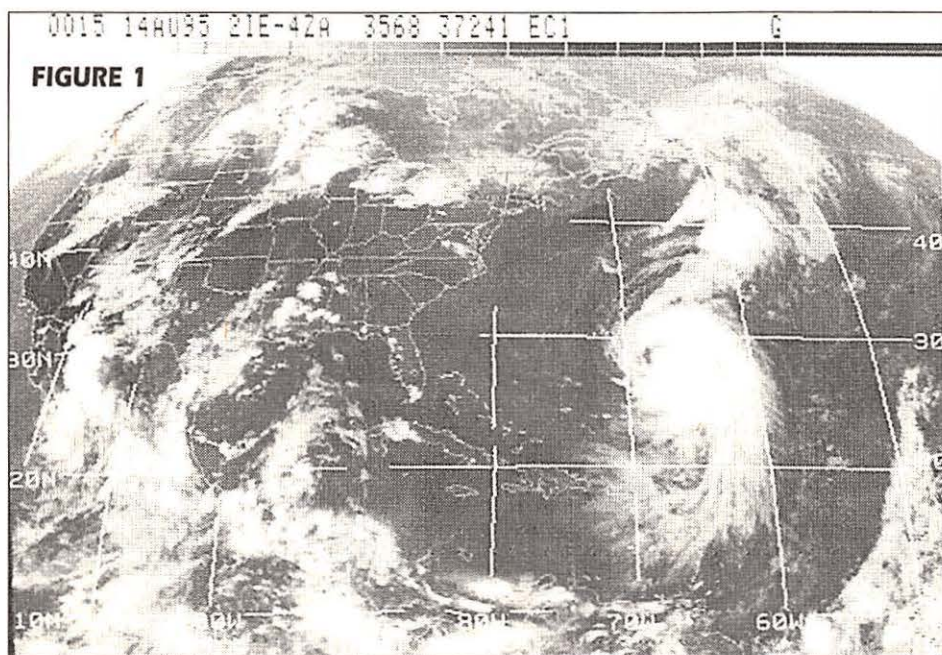
The HF fax receiving system described in this article consists of an antenna, communications receiver, demodulator, an IBM-compatible 286 or later PC with VGA graphics, and JV-FAX software (Figure 2).

Any good shortwave antenna should suffice. However, it should be located away from TV sets, computers, and other electronic devices to minimize pick-up of the interference they generate. I've had good results using an end-fed, horizontal long wire 75 feet (22.7 meters) in length.

Fax image quality largely depends on the receiver. Best results will be had with a sensitive, stable, selective communications receiver such as a Kenwood R-5000. Good fax reception is possible with many mid-range models such as the Sangean ATS-818CS. I've even seen faxes received on an old Radio Shack DX-302. However, any receiver intended for fax reception must be capable of CW and SSB reception.

The demodulator is a simple analog-to-digital converter. It takes the analog audio signal from the receiver's headphone jack, converts it to a digital signal, and feeds it into the computer's communications port. The demodulator circuit (Figure 3) is based on a 751 op amp IC, uses few components, and is easy to build. The required components are listed in Table 1.

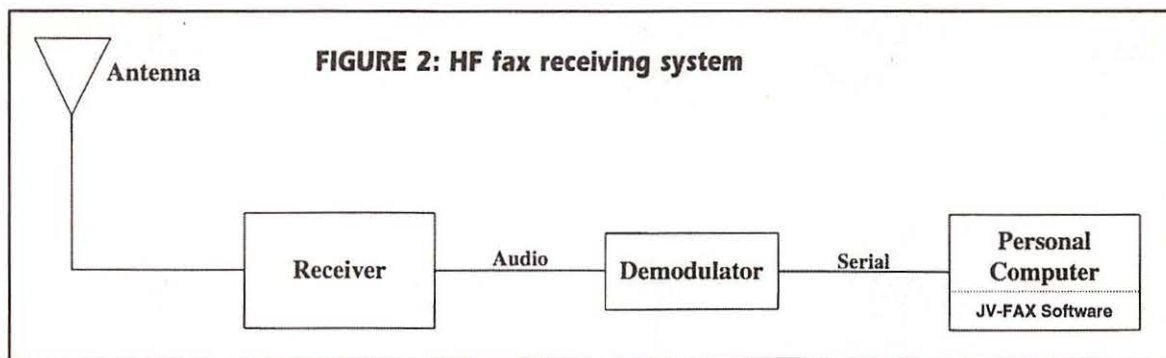
The final system component is an IBM-compatible 286 or later personal computer



This HF fax image of Hurricane Felix was received using the demodulator and software described in this article.

TABLE 1
Demodulator Parts List

Code	Description	Radio Shack Part Number
C-1	Capacitor, 0.1 uF	272-1069
C-2	Capacitor, 1.0 uF tantalum	272-1434
C-3	Capacitor, 1.0 uF tantalum	272-1434
D-1	Diode, 1N4148	276-1122
D-2	Diode, 1N4148	276-1122
D-3	Diode, 1N4148	276-1122
D-4	Diode, 1N4148	276-1122
J-1	Connector, female DB-25	276-1548
P-1	Audio plug, 1/4- or 1/8-inch	
R-1	Resistor, 100-k Ohm, 1/4-watt	271-1347
R-2	Resistor, 100-k Ohm, 1/4-watt	271-1347
U-1	OpAmp, LM-741	276-007
W-1	Cable, shielded audio	278-512
	Circuit Board, perforated	276-159
	Socket, IC	276-1995



- * IOC: 576
- * LPM: 120
- * Deviation: 500
- * ATC: on
- * Intensity levels: 64
- * Display width usage (%): 100
- * Receive pictures inverted: on
- * Press Ctrl + <Return>.
- * The JV-FAX Main screen reappears

with VGA or SVGA graphics. Residing within the PC is the sophisticated JV-FAX software. Two versions of the software—JV-FAX 7.0 and 7.1—are currently in use. The two are virtually identical, except that 7.0 saves faxes as GIF files, and 7.1 saves them as TIFs. The software is available free of charge from numerous sources (Table 2). This article will assume that you'll be installing and using JV-FAX 7.0.

■ Software Installation

Software installation is fairly simple, but since I had to discover how to install and operate the program by pure trial and error, this article will lead you through the procedure. It involves gathering com port address and IRQ information regarding your PC, creating places on the hard drive for the program and received faxes, loading the JV-FAX program, decompressing the files, and configuring the program's Mode and Configuration screens.

Areas on the C drive for the program and faxes are created as follows:

PC

- * Go to the DOS prompt.
- * Verify that the C drive has been selected.
- * Type `mkdir JVFX <Return>`
- * Type `mkdir HFFAX <Return>`
- To obtain com port address and IRQ information regarding your PC, do the following:
- * Turn the printer ON.
- * Go to the DOS prompt.
- * Verify that the C drive has been selected
- * Type `msd <Return>`
- * The MS Diagnostics menu appears.

MS Diagnostics Menu

- * Type c
- * The Com Port Summary screen appears

Com Port Summary Screen

- * Press Shift + Print Scrn
- * Type ok <Return>
- * The MS Diagnostics menu reappears

MS Diagnostics Menu

- * Type q
- * The IRQ Status screen appears

IRQ Status Screen

- * Press Shift + Print Scrn
- * Type ok <Return>
- * The MS Diagnostics menu reappears

MS Diagnostics Menu

- * Press F3
- * The DOS prompt appears

To install the JV-FAX program, you will need to obtain the JV-FAX software from a BBS or other source and load it to the path C:\JVFX as follows:

- * Go to the DOS prompt.
- * Verify that the C drive has been selected.
- * Type `cd\JVFX <Return>`
- * Type `PKUNZIP JVFX.ZIP <Return>`
- * The screen should begin listing files that have been decompressed.
- * If the computer asks you to overwrite a file, type Y <Return>.
- * Installation should now be complete.
- * Type `cd\ <Return>`

Configure the software by following the procedure outlined below:

PC Main Screen

- * Go to the DOS C:\ prompt.
- * Type `cd\JVfx <Return>`
- * Type `JVfx <Return>`
- * The JV-FAX Main screen appears.

JV-FAX Main Screen

- * Type m
- * The Mode screen appears.

JV-FAX Mode Screen

- Change the entries to the following:
- * Mode: 1 Wefax576

JV-FAX Main Screen

- * Type c
- * The JV-FAX Configuration screen appears

JV-FAX Configuration Screen

Change the entries in the following fields to read as indicated:

- * Demodulator: 6 bits HAMCOMM
- * addr: Set as appropriate (refer to the address information on the msd printout)
- * IRQ: Set as appropriate (refer to the IRQ information on the msd printout)
- * LSB-SSTV-sync: yes
- * Bdrate: 9600
- * Dtarate: 9600
- * Graphics: Set as appropriate
- * T-C graph: Set as appropriate
- * Max interrupt frequency: 7500
- * Default picture directory: C:\HFFAX
- * Press Ctrl + <Return>
- * The JV-FAX Main screen reappears

■ Receiving faxes

To receive an HF fax, do the following:

Receiver

- * Tune to an active HF fax frequency (8,080.0 kHz is a good bet, or select an active frequency from Table 3)
- * Tune the receiver 1.750 kHz above the listed carrier frequency (for example, to tune in NMN on 8,080.0 kHz, tune to 8,081.75 kHz).
- * Go to LSB mode
- * Select Narrow selectivity (about 1 kHz)
- * Set the audio level to the 10 o'clock position.

PC Main Screen

- * At the DOS prompt, type `cd\JVFX <Return>`
- * Type `JVFX <Return>`

JV-FAX Main Screen

- * Verify that the fax option is highlighted
- * Press <Return>

JV-FAX Receive Screen

- * Verify that the M): field is set to Wefax576
- * Verify that the A)PT: field is set to "waiting"

TABLE 2
JV-FAX Software Sources

ARRL BBS : 860-594-0306
Compuserve Ham Net Forum Library

- * Type a
- * The A)PT: field should read "running"

An image should slowly begin building up on the screen. If the fax is too dark, tune the receiver down in 0.1 kHz steps; if the image is too light, tune upwards like increments. The fax will probably be split the left side on the right and the right on the left. This is normal and is easily fixed later. After a fax has been received, save it with the following key strokes:

- * Type a
- * Press F2
- * Enter a file name with a .GIF extension (i.e., fax1.GIF)
- * Press <Return>
- * Exit the fax receive screen by typing q

■ Editing faxes

The software allows you to edit images in various ways including cropping, enhancing contrast, and changing their orientation. The most frequently used editing feature is roll correction. Virtually all faxes are received with a roll error which results in an image being split with the left portion showing up on the right side of the screen and vice versa. To repair a fax with this problem, go to the JV-FAX Main Screen and do the following:

- * Move the highlight bar to the "Show and Send Pictures" option
- * Press <Return>
- * The Fax Library Screen appears

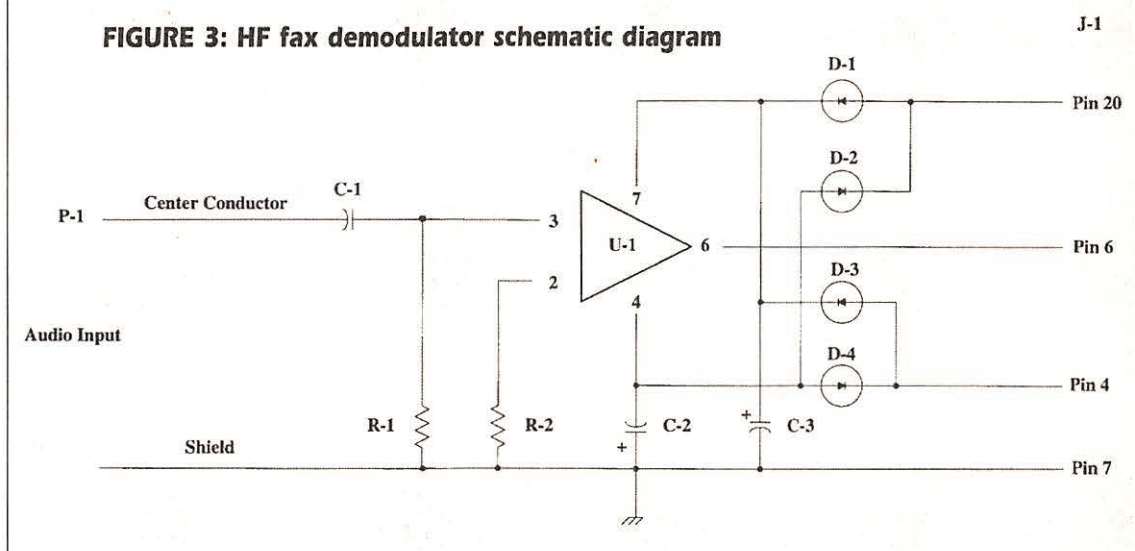
Fax Library Screen

- * Move the highlight bar over the name of the file to be edited
- * Press <Return>
- * The Fax Viewing Screen with the saved image appears

Fax Viewing Screen

- * Press R
 - * Move the vertical line to the center of the gutter
 - * Press <Return>
 - * Press F2
 - * Type in a new file name for the image (i.e. FAX01.GIF)
 - * Press <Return>
 - * The Fax Library Screen reappears
- Congratulations; you have now received, saved, and edited your first HF fax.

FIGURE 3: HF fax demodulator schematic diagram



■ Fax Reception Hints

If your receiver has programmable memory channels, you can save yourself a lot of work by loading the frequencies of the stronger fax stations and group the frequencies used by each station together. These techniques make finding and tuning in transmissions easier and allows you to select the best frequency for a selected station.

The quality of the faxes received from a given station varies. Excellent reception one day may be followed by poor copy the next. Reception also varies with the time of day. It's worthwhile to check a station's signal quality on different frequencies at different times.

Another piece of advice is to ignore the tuning display on the software's fax receive window. The best tuning indication is fax image quality. Most faxes are best received 1.750 kHz above the station's carrier frequency. If the image is too dark, tune downward in 0.1 kHz steps; if it's too light, tune upwards in like increments.

Although most images are sent at 120 LPM with an IOC of 576, some pictures are sent using 60 LPM and an IOC of 288. This is especially true of stations in the former Soviet Union and East Asia. North Korean press photos are sent at 60 LPM with an IOC of 325. Faxes with these parameters can be received by going to the Mode screen and setting the IOC and LPM accordingly.

■ Conclusion

Fax reception opens up a new dimension to shortwave listening, allowing DXers to see radio as well as hear it. The combination of a low cost, simple fax demodulator, and sophisticated shareware puts this exciting capability within reach of virtually all SWLs. This nifty software combination also decodes Morse code and RTTY transmissions, so we encourage you to build it and you will see. For less than \$20, how can you lose?!

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Cover frequencies from 100 kHz to 1,999.99 MHz* using 10 Hz tuning steps. You'll receive SSB (USB, LSB), AM (Normal, Narrow, Wide), FM (Narrow, Normal), WFM, and CW!

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- S-Meter Squelch (in addition to ordinary noise squelch)
- Noise Blanker (SSB/AM)
- 3 Antenna Connectors
- 12 VDC/120 VAC



<http://www.icom-america.com/icom>

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ICOM



From Pings to Pirates

By Larry Van Horn
Expo '96 Publicity Chairman

Are you interested in the world of radio below 30 MHz? Do you like VLF, AM broadcast band, HF utility, pirate/ clandestine, or shortwave broadcast listening? If the answer is yes to any of the subjects above, then this year's Grove Communications Expo has some forums you will be interested in attending.

The "below 30" forums kick off Saturday morning in radio's basement. "Whistlers, pings, clicks, dawn chorus," — perhaps you're familiar with these terms — but just where do these VLF signals originate? What causes them to appear? And most importantly, how can you tune in? *MT's* Kevin Carey will explore these and other natural radio topics, such as earthquake precursors, lightning, and indirect solar flare detection. Join us at 9:00 a.m. for this non-technical look into the sounds of nature.

At 10:15 a.m. we move up in frequency to the AM broadcast band. You probably already have the equipment needed to get started DXing AM broadcast stations. Learn some log-filling tips from *MT's* Doug Smith — sunset skip, the experimental period, daytime DXing, and much more. You will also get a layout of the AM band (clear, regional, and local channels) and the history that created it.

If shortwave broadcast listening is your cup of tea then don't miss Richard Arland's forum at 1:00 p.m. on Saturday called *DXing the Shortwave Broadcast Bands*. Richard will present an overview of techniques and equipment used to explore the shortwave spectrum. Emphasis will be placed on shortwave and tropical band DXing, QSLing, propagation, antennas, logging, and awards.

Some international broadcast organizations are shrinking because of budget cuts, but illicit pirate and clandestine operators are flourishing. *MT* columnist George Zeller looks at the latest news in unlicensed broadcasting and even lets you listen to a few of them during his 2:15 p.m. forum Saturday.

The study of radio propagation has always been a mystery to many listening to the HF spectrum. But to hear those difficult catches the DXer needs to have a better understanding of the medium that propagates distant signals to the HF receiver. *MT* propagation columnist Jacques d'Avignon will discuss how to use grayline DXing to add those elusive catches to the logbook at his 3:15 p.m. forum on propa-

gation. Jacques will also discuss how you can use propagation forecasts in planning your DX sessions.

Sunday morning's HF sessions will be devoted to hot topics in the world of utility listening. On shortwave frequencies, 78 percent of the available spectrum is devoted to utility type stations (non-broadcast/amateur radio frequencies). If you aren't listening to these transmissions, you aren't getting the full value out of your HF receiver.

ACARS (Aircraft Communications Addressing and Reporting System) is one of the new listening areas being explored in the HF and VHF spectrums. This system is now a worldwide air/ground network which enables aircraft to function as mobile terminals linked to ground-based command and control management systems. Learn how this process evolved and how you can tune it in during Bob Evans' talk starting at 9:00 a.m.

At 10:15 a.m., *MT Ute World* columnist Larry Van Horn will take to the podium to discuss the latest changes in the HF spectrum and pass along some hot frequencies you can tune on your receiver. There will also be a brief discussion on uncovering military call signs on HF.

Finally, at 11:30 a.m., *MT's* Bob Evans will return to the podium to close out the Expo by discussing digital communications. With the advent of satellite technology, many of the signals previously tuned by digital monitors have disappeared from the HF bands. In addition, new digital modes continue to appear, keeping signal decoding manufacturers always one step behind. This seminar will explore those stations which continue to use the HF airwaves, the new digital modes introduced during the year since the last Grove Expo, and the current decoding equipment available to the amateur hobbyist. An extensive handout covering all known digital modes will also be available.

Getting There

If you are going to travel by air to the 1996 Grove Communications Expo, don't forget to make your reservations with the official airline of this year's convention — American Airlines. They are offering some great rates to



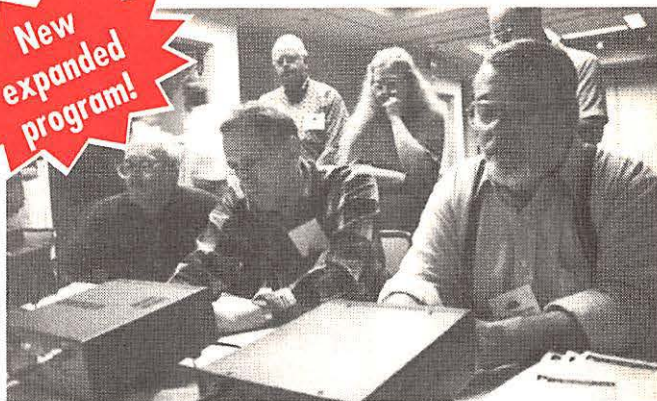
See our pages on the World Wide Web for schedules and updates.



TIME	TOPICS	DEMONSTRATING	INTEREST	MAJOR
				HAPPENINGS
9:00-10:00	Below 30 MHz	Kevin Carey	9:00-10:00	Below 30 MHz
10:15-11:00	AM Broadcast Band	Doug Smith	10:15-11:00	AM Broadcast Band
11:00-11:30	Shortwave Broadcast Bands	Richard Arland	11:00-11:30	Shortwave Broadcast Bands
11:30-12:00	Digital Communications	Bob Evans	11:30-12:00	Digital Communications
12:00-12:30	Utility Listening	Bob Evans	12:00-12:30	Utility Listening
12:30-1:00	ACARS	Bob Evans	12:30-1:00	ACARS
1:00-1:30	DXing the Shortwave Broadcast Bands	Richard Arland	1:00-1:30	DXing the Shortwave Broadcast Bands
1:30-2:00	Pirate/Clandestine	George Zeller	1:30-2:00	Pirate/Clandestine
2:00-2:30	Propagation	Jacques d'Avignon	2:00-2:30	Propagation
2:30-3:00	Grayline DXing	Jacques d'Avignon	2:30-3:00	Grayline DXing
3:00-3:30	Antennas, Logging, and Awards	Kevin Carey	3:00-3:30	Antennas, Logging, and Awards
3:30-4:00	Utility Listening	Bob Evans	3:30-4:00	Utility Listening
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11:30-12:00	ACARS	Bob Evans	11:30-12:00	ACARS
12:00-12:30	Digital Communications	Bob Evans	12:00-12:30	Digital Communications
12:30-1:00	Utility Listening	Bob Evans	12:30-1:00	Utility Listening
1:00-1:30	ACARS	Bob Evans	1:00-1:30	ACARS
1:30-2:00	Digital Communications	Bob Evans	1:30-2:00	Digital Communications
2:00-2:30	Utility Listening	Bob Evans	2:00-2:30	Utility Listening
2:30-3:00	ACARS	Bob Evans	2:30-3:00	ACARS
3:00-3:30	Digital Communications	Bob Evans	3:00-3:30	Digital Communications
3:30-4:00	Utility Listening	Bob Evans	3:30-4:00	Utility Listening
4:00-4:30	ACARS	Bob Evans	4:00-4:30	ACARS
4:30-5:00	Digital Communications	Bob Evans	4:30-5:00	Digital Communications
5:00-5:30	Utility Listening	Bob Evans	5:00-5:30	Utility Listening
5:30-6:00	ACARS	Bob Evans	5:30-6:00	ACARS
6:00-6:30	Digital Communications	Bob Evans	6:00-6:30	Digital Communications
6:30-7:00	Utility Listening	Bob Evans	6:30-7:00	Utility Listening
7:00-7:30	ACARS	Bob Evans	7:00-7:30	ACARS
7:30-8:00	Digital Communications	Bob Evans	7:30-8:00	Digital Communications
8:00-8:30	Utility Listening	Bob Evans	8:00-8:30	Utility Listening
8:30-9:00	ACARS	Bob Evans	8:30-9:00	ACARS
9:00-9:30	Digital Communications	Bob Evans	9:00-9:30	Digital Communications
9:30-10:00	Utility Listening	Bob Evans	9:30-10:00	Utility Listening
10:00-10:30	ACARS	Bob Evans	10:00-10:30	ACARS
10:30-11:00	Digital Communications	Bob Evans	10:30-11:00	Digital Communications
11:00-11:30	Utility Listening	Bob Evans	11:00-11:30	Utility Listening
11:30-12:00	ACARS	Bob Evans	11:30-12:00	ACARS
12:00-12:30	Digital Communications	Bob Evans	12:00-12:30	Digital Communications
12:30-1:00	Utility Listening	Bob Evans	12:30-1:00	Utility Listening
1:00-1:30	ACARS	Bob Evans	1:00-1:30	ACARS
1:30-2:00	Digital Communications	Bob Evans	1:30-2:00	Digital Communications
2:00-2:30	Utility Listening	Bob Evans	2:00-2:30	Utility Listening
2:30-3:00	ACARS	Bob Evans	2:30-3:00	ACARS
3:00-3:30	Digital Communications	Bob Evans	3:00-3:30	Digital Communications
3:30-4:00	Utility Listening	Bob Evans	3:30-4:00	Utility Listening
4:00-4:30	ACARS	Bob Evans	4:00-4:30	ACARS
4:30-5:00	Digital Communications	Bob Evans	4:30-5:00	Digital Communications
5:00-5:30	Utility Listening	Bob Evans	5:00-5:30	Utility Listening
5:30-6:00	ACARS	Bob Evans	5:30-6:00	ACARS
6:00-6:30	Digital Communications	Bob Evans	6:00-6:30	Digital Communications
6:30-7:00	Utility Listening	Bob Evans	6:30-7:00	Utility Listening
7:00-7:30	ACARS	Bob Evans	7:00-7:30	ACARS
7:30-8:00	Digital Communications	Bob Evans	7:30-8:00	Digital Communications
8:00-8:30	Utility Listening	Bob Evans	8:00-8:30	Utility Listening
8:30-9:00	ACARS	Bob Evans	8:30-9:00	ACARS
9:00-9:30	Digital Communications	Bob Evans	9:00-9:30	Digital Communications
9:30-10:00	Utility Listening	Bob Evans	9:30-10:00	Utility Listening
10:00-10:30	ACARS	Bob Evans	10:00-10:30	ACARS

GROVE COMMUNICATIONS EXPO

New
expanded
program!



Come to Grove Communications EXPO '96!

Superb Forums
and Seminars!



If you are interested in **electronic communications**, the **Grove Communications Expo** is your event of the year! Expo '96 in Atlanta, to be held **Oct. 18-20**, unites you with hundreds of like-minded communications enthusiasts who assemble to **exchange information, introduce new products, and offer technical help**. This is an outstanding opportunity for you to move into the information age! This year's expanded program includes over **50 seminars, forums, demonstrations and events** in the following areas:

- ❖ Computers and the Internet
- ❖ Shortwave and scanner monitoring
- ❖ Satellite communications
- ❖ Radio astronomy

As in recent years, the Expo will feature exhibits by top-name vendors, a hands-on listening post, club booths and

prizes. Tours will be conducted to the **Delta Communications Center, Atlanta Fire Communications, Atlanta/Fulton County Communications Center** and more.

Keynote speaker at this year's banquet will be **Ron Parise, NASA astronaut** and astronomer. Parise, WA4SIR, has made two trips into space aboard the shuttle and operated the shuttle's amateur radio experiments (**SAREX**). Several special workshops, forums and exhibits will be sponsored this year by the Society of Radio Astronomers (**SARA**), which will be conducting their fall conference in conjunction with the Expo!

This year's scheduled exhibitors include **AMSAT, Bearcat Radio Club, Cellular Security Group, Computer Aided Technology, Dallas Remote Imaging Group, Drake, Electronic Distributors (EDCO), Grove Enterprises, ICOM, Image the Earth, OptoElectronics, Radio Astronomy Supplies, Radio Progressive, Satscan Electronics, Scan Master, Signal Intelligence, Sony, Swagur Enterprises, and Transel Technologies.**



The Famous
"Bug Hunt"



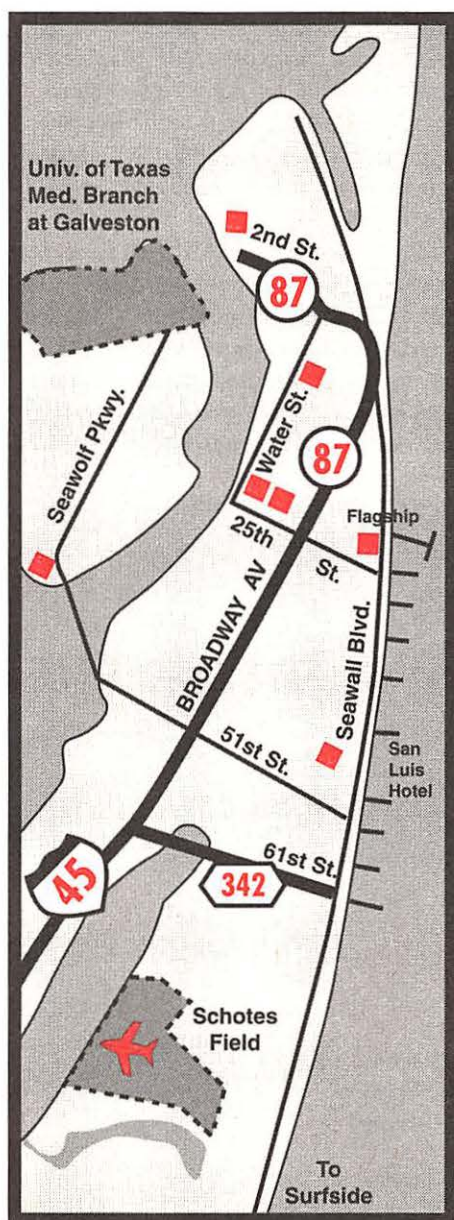
Atlanta Airport Hilton October 18-20, 1996

Registration is \$55 per person (take \$10 off if you bring a first-time registrant with you). Rooms at the Airport Hilton available at the convention rate of \$76 per night, single or double occupancy. Call 1-800-Hiltons.

For more information and schedules, set your web browser to <http://www.grove.net/hmpgexpo.html>, e-mail us at expo96-info@grove.net, phone us at 1-800-438-8155, or fax us at 1-704-837-2216.



Scanning Galveston Island



Galveston's 32 miles of beaches are usually awash with swimmers and fishermen, but keep your ear on the radio during hurricane season.

By John Frazier, KB5WCW

Galveston, Texas—it's both a city and an island, with some 32 miles of beach, and more than two dozen other tourist attractions, including antique cars, World War Two aircraft, historic homes, parks, and more. Galveston was the first city in Texas to have electric lights and was home to the first medical college in Texas. In 1817 pirate Jean Laffite established a settlement there.

Its Gulfside location also makes it vulnerable to hurricanes, however. In 1900 the entire island was destroyed by a hurricane which claimed over 6,000 lives, and in 1969 it took a devastating blow from Hurricane Camille. Substantial advance warning of a storm's approach is essential if the island is to be evacuated over a limited number of bridges.

The island is a regular hotbed of scanner activity. Police and other public service radio services are busy with activity year around. As soon as the summer vacationers leave, then retirees and others from the cold North (known by the locals as "Winter Texans"), move into the area for the winter months. About the time they leave the area in the spring, Galveston is

overrun by thousands of inland college students from all over the country celebrating "Spring Break." Shortly after Spring Break the cycle begins all over again.

■ Doing the Tourist Thing

"I need some help over here!" "Man down at 64th Street pier." "He's shooting up the first floor!" "He's coming in on me!"

These are just a few sound bites from dispatchers and patrol units heard on my base scanner that I brought with me on my Gulf Coast vacation. In the security of my rented, beach front house, I tuned into the action of the Sheriff Department, Volunteer Fire Departments, Beach Patrol, Coast Guard, and three City Police Departments.

With a programmable scanner, one of the many frequency books available, as well as locally compiled frequency lists usually available from scanner retailers at little or no cost, you can be on top of the action just about anywhere you go. If you have a portable scanner or mobile scanner you can follow the action as you go. Just punch in the local frequencies that you want to listen to and you are ready for action.

Not having a portable or mobile, I had to wait until I could plug mine in at the house. I did my homework before I left and got a list of likely frequencies from the police frequency book I purchased from Radio Shack. When I got to my destination I stopped at a local Radio Shack store and asked for a list of local frequencies. This has become my usual practice whenever I am in a new city, and it has resulted in acquiring several good lists.

This particular store did not give the list away, but let me copy frequencies off of the

list. I compared the local list to what I had entered from *Police Call*. I have found that the published books often list all frequencies licensed to different departments—many of which may not be used. So the local list saves you time and gets you started with the most active frequencies in the area. My final list is shown in Table 1.

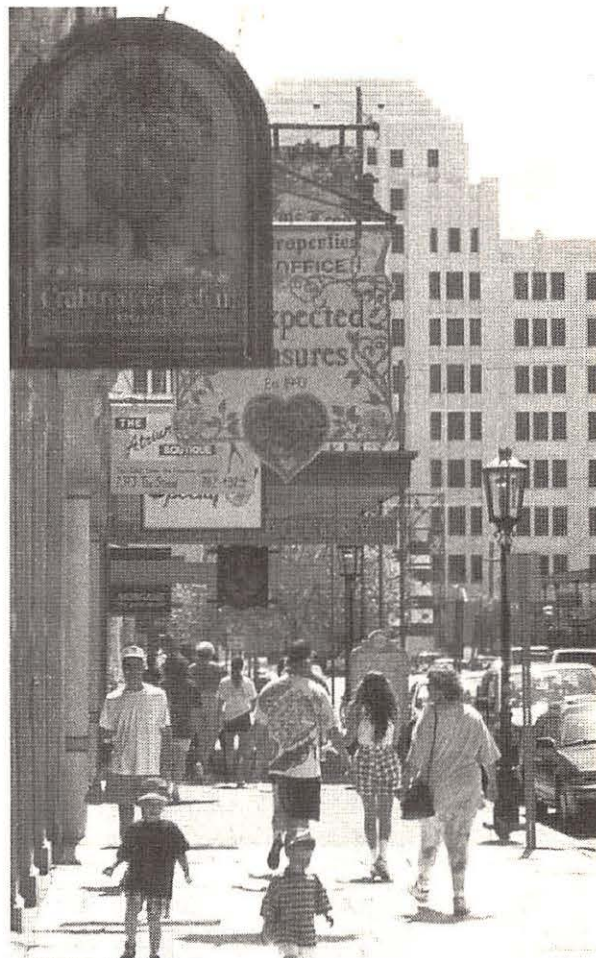
Another good source of active local frequencies is the local scanner club. If there is one in the area where you plan to visit you might write them a month or so in advance and request a list from them. If they are meeting while you are in town you might enjoy attending one of their meetings.

If your scanner has a search feature you can use it to search various frequency assignments that interest you. I generally am interested in public service—police, fire, ambulance, etc. Using the search feature enables you to search frequency blocks, such as business, military, marine, paging, etc. for action.

Another advantage of taking your scanner with you is being able to tune local weather service stations. The National Oceanic and Atmospheric Administration (NOAA) publishes a brochure giving the locations of all their radio stations and frequencies. Very few places are out of range of one of these stations.

When I decide what frequencies I am going to listen to I enter them on a simple frequency list. By each channel number I enter the frequency and the station so I can tell who I am listening to at a glance. When you are out of town with a lot of new frequencies to deal with, this channel list is very handy. When you check the channels that proved to be active, it provides a written list of verified frequencies you can take home and share with your friends.

If you enjoy your scanner at home, there



The Strand in Galveston is a renovated historical district whose shops, clubs, restaurants, etc., attract both tourist and local traffic year-round.

is no reason why it can't go on vacation with you. With a little bit of advance planning it can be a fun experience. There's no telling what you might hear, especially during hurricane season.



An emergency operations center at the Galveston District, U.S. Army Corps of Engineers, is activated during times of crisis — flooding, hurricanes and other man-made or natural disasters.

TABLE 1
Galveston Area Frequencies (MHz)

Galveston Police	460.200
Galveston Beach Patrol	145.800
Galveston EMS	155.115
Galveston Sheriff's Ofc.	155.565
Galveston Sheriff's Ofc.	155.875
Galveston Sheriff's Ofc.	155.870
Galveston Sheriff's Ofc.	155.800
Texas City Police	453.975
U.S. Coast Guard	157.050
Friendswood Police	453.775
Friendswood Police	453.325
Friendswood Vol. Fire Dept.	159.225
Webster Police	453.300
Webster Police	453.575
Webster/Forest Bend VFD	154.235
Nassau Bay Police	453.475
Seabrook Police	153.830
Alvin Police	155.520
Alvin Vol. Fire Dept.	154.845
League City Police	856.9875
League City Vol. Fire Dept.	154.175



Fast Food Smorgasbord

Scanning the fast food windows can be pretty routine, but it's a fun catch anyway—and sometimes you get a surprise.



By Bob Grove

"Welcome to McDonald's. May I take your order?" How many thousands of times every day is this friendly greeting parroted across the country? And how many scanner enthusiasts tune in 154.600 and 35.02 MHz as they drive past interchanges on our nation's highway system?

But the big arches are not the only architecture to house friendly fast-food frequencies. Just about every chain with a drive-by kiosk has two-way intercommunications with its customers, using frequencies in low band, high band, UHF, and even 900 MHz.

While the belt-worn transceivers are low power, the fixed repeater can usually be heard for a half mile or more. A local McDonald's restaurant uses a Panasonic system known as the "Order Taker," a likely name, indeed. A nearby Hardees' system is made by H.M Electronics. While the radios are usually sub-audibly tone encoded to avoid interference (see Table 4); some cases of intentional interference have led to substantial fines and suspension of FCC licenses when hams have abused their radio privileges.

Some unintentional interferences have proved amusing. A church reportedly installed a wireless public address system on the same frequency as an adjoining fast-food restaurant. As the minister raised his eyes skyward and requested divine guidance, his parishioners heard the electronic reply: "Cheeseburger, all the way, hold the mayo!"

Clerks frequently switch to internal intercom without realizing that, while the customers can't hear their comments, stalwart scanning

enthusiasts can. Common fare includes discussions of dates, working conditions, other employees—and their employers, and remarks about customers. When the scanner listener happens to *be* the customer, he reaps a particular delight in catching the employee off guard by responding to what was supposedly a private remark.

A short time ago we learned of one resourceful—and highly unlawful—prank pulled by a ham with a crossband-capable transceiver. Poised between two prominent fastfood restaurants, he tuned in the customer frequencies from one restaurant and retransmitted it to the competitive restaurants' order takers. Wendy's order takers were understandably miffed when they were getting orders for Big Macs, while McDonald's clerks were scratching their heads figuring out how to serve up a Frosty! It may seem like harmless fun, but don't do it!

This month *MT* takes a look at the vast, largely unrecognized spectrum shared by these harbingers of hamburgers. We owe a special debt of gratitude to Bob Eisner for sharing the largest and most-up-to-date list of fast food frequencies ever published.

The list was last updated in May 1996. It was compiled from numerous posts on the Internet news groups alt.radio.scanner and rec.radio.scanner from many posters, among them:

1. Robert H. Eisner <beisner@erols.com>
2. Joseph E. Hayes III <jhayes3rd@nmaa.org>
3. Bob Grove <bob@grove.net>
3. Keith A Monahan <kamsi39+@pitt.edu>

4. Todd Penney <tpenn@atcon.com>
5. Brian E. Davis <bedavis@ix.netcom.com>
6. Brian Graham <briang@informp.net>
7. Brian Varine <varineb@ucs.orst.edu>
8. Myles Barkman <kg5ai@cy.net.net>
9. Burke Haworth
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10. Joe Simon
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11. LOCKSMITHING@hamlet.planet.net
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13. mcneill@salem.enet.dec.com
14. Bob Parnass <parnass@ihlpm.att.com>
15. stretch1@aol.com
16. Berton Carson <g9153402@huey.csun.edu>
17. ekholm@skypoint.com
18. Steve Karolek <skarolek@execpc.com>
19. Robert Barker <robert@eden.com>
20. DennyRB@aol.com

Thanks for sharing the information!

TABLE 1
Frequencies to Check for Fast Food
Restaurants & Gas Stations

VHF-low:

30.7600 30.8000 30.8400 30.8800 30.9200 30.9600
31.0000 31.0400 31.1600
31.2000 31.2400 33.1400 33.1600 33.4000 35.0200
35.0400 35.0600 35.0800
35.1000 35.1200 35.1400 35.1800 35.7000 35.7200
35.8800 35.9000 35.9200
35.9400 35.9600 35.9800 42.9600 42.9800 43.0000
49.8300 49.8450 49.8600
49.8750 49.8900

VHF-high:

151.6250 151.6550 151.6850 151.7150 151.7450
151.7750 151.8050 151.8350
151.8650 151.8950 151.9250 151.9550 154.5150
154.5400 154.5700 154.6000
169.4450 169.5050 170.2450 170.3050 171.0450
171.1050 171.8450 171.9050

UHF:

457.5125 457.5250 457.5375 457.5500 457.5625
457.5750 457.5875 457.6000
457.6125 467.7375 467.7500 467.7625 467.7750
467.7875 467.8000 467.8125
467.8375 467.8500 467.8625 467.8750 467.8875
467.9000 467.9125 467.9250

460.6625 460.6875 460.7125 460.7375 460.7625
460.7875 460.8125 460.8375
460.8625 460.8875 460.9125 460.9375 460.9625
460.9875

462.7625 462.7875 462.8125 462.8375 462.8625
462.8875 462.9125

461.0000 thru 462.1875 with 12.5 kHz step
463.2000 thru 464.9875 with 12.5 kHz step

465.6625 465.6875 465.7125 465.7375 465.7625
465.7875 465.8125 465.8375
465.8625 465.8875 465.9125 465.9375 465.9625
465.9875

466.0000 thru 467.1875 with 12.5 kHz step
468.2000 thru 469.9875 with 12.5 kHz step

Special Industrial (GM Style headsets)

920.0000 - 921.0000 with 12.5 kHz step WIDE FM
(Speaker)
903.0000 - 904.0000 with 12.5 kHz step WIDE FM
(Headset)

TABLE 2
Fast Food & Gas Station Frequency Pairing by Company

Restaurant	Customer (R)	Clerk (I)
Arbys	30.8400 31.0000 457.5500 460.8875 461.0375 920.7250 WFM	154.5700 170.3050 467.7750 465.8875 466.0375 903.7250 WFM
Bakers Dozen Donuts (Canada)	457.5750	467.9750
Bess Eaton Donut	457.5375	467.7625
Bobs Big Boy	30.8400 457.6000	154.5700 467.8250
Bobs Burger Express	469.0125 469.0375 469.0625 469.0875 469.1125 469.1375 469.1625 469.1875 469.2125 469.2375 469.2625 469.2875 469.3125 469.3375 469.3625 469.3875	464.0125 464.0375 464.0625 464.0875 464.1125 464.1375 464.1625 464.1875 464.2125 464.2375 464.2625 464.2875 464.3125 464.3375 464.3625 464.3875
Boston Market	33.1600 33.4000	154.5150 154.5400
Braums	31.0000 457.6000 461.0875 461.5375 462.1625	170.3050 467.7500 466.0875 466.5375 467.1625
Burger King	30.8400 31.0000 33.4000 457.5500 457.5625 457.5750 457.6000 460.8875 461.2875 461.5375 469.0125	154.5700 170.3050 154.5400 467.7750 467.7875 467.8000 467.8250 465.8875 466.2875 466.5375 464.0125
Burgerville	30.8400	154.5700
Carls Jr	30.8400 457.5375 457.5500 461.0875	154.5700 468.3875 467.7750 466.0875
Chick Fil A	31.0000	170.3050
Coffee Time(Canada)	920.7375 WFM	UNKNOWN
Coulters BBQ	31.0000	170.3050
Country Style(Canada)	457.5750	467.8000
Dairy Queen	30.8400 460.8875 461.0875 461.5375 462.1625	154.5700 465.8875 466.0875 466.5375 467.1625
Dairy Queen(Canada)	920.2625 WFM	UNKNOWN



Dunkin Donuts	30.8400 33.1600 33.4000 457.5500	154.5700 154.5150 154.5400 467.7750
El Mexicano	464.9625	469.9625
El Pollo Loco	457.5500	467.7750
Foster Freeze	31.0000	170.3050
GD Ritzys	35.1000	UNKNOWN
Hardees	30.8400 31.0000 33.0200 457.5375 460.8875 461.0875 461.1125 462.1625 469.0125	154.5700 170.3050 154.6000 467.7625 465.8875 466.0875 466.1125 467.1625 464.0125
Hot Dog Etc	30.8400 31.0000 33.1400	154.5700 170.3050 151.8950
Jack in the Box	33.4000 35.0200 457.5750 469.0250	154.5400 154.6000 467.8000 464.0250
James Coney Island	463.9875	468.9875
Kenny Rogers Roasters Chicken	469.0125 920.2875 WFM	464.0125 903.2875 WFM
Kentucky Fried Chicken	30.8400 31.0000 33.1400 33.1600 33.4000 35.0200 457.5375 457.5875 457.6000 460.8875 461.0875 462.1625 462.7625 464.0875	154.5700 170.3050 151.8950 154.5150 154.5400 154.6000 468.3875 467.8125 467.8250 465.8875 466.0875 467.1625 467.8875 469.0875
Long John Silvers	33.1600 33.4000	154.5150 154.5400
McDonalds(Canada)	30.5800 30.8400 30.8400	154.4900 151.6700 154.1450
McDonalds	30.8400 31.0000 33.1400 33.1400 33.4000 33.4000 35.0200 35.0200 35.0200 151.7150 151.7450 151.7750 151.8650 154.5700 154.6000 457.5375 457.5500 457.6000 460.8875 461.0375 461.0875 461.3125 462.1625 463.2875 464.5125 469.0125	154.5700 170.3050 151.8950 170.3050 154.5400 154.5700 151.8950 154.4900 154.6000 169.4450 UNKNOWN 171.9050 UNKNOWN 170.2450 171.1050 461.0875 467.7750 467.8250 465.8875 466.0375 466.0875 466.3125 467.1625 468.2875 469.5125 464.0125

	469.1125	464.1125
	469.1375	464.1375
	469.1625	464.1625
	469.1875	464.1875
	469.3125	464.3125
	469.3375	464.3375
	469.3875	464.3875
	920.5000 WFM	903.5000 WFM
Mrs Winners Drive-up	30.8400	154.5700
Popeyes	33.4000	154.5400
	469.0125	464.0125
Rallys	30.8400	154.5700
	33.1600	154.5150
	457.5375	468.3875
	461.0875	466.0875
	461.5375	462.1625
	469.0125	464.0125
Roy Rogers	30.8400	154.5700
	33.1600	154.5150
	33.4000	154.5400
	457.5375	467.7625
	469.0125	464.0125
	469.9250	464.9250
Sheetz Gas Station	NONE	49.8300
	469.0125	464.0125
Sonic	33.1600	154.5150
Taco Bell(Canada)	30.4000	UNKNOWN
Taco Bell	30.8400	154.5700
	31.0000	170.3050
	33.1600	154.5150
	33.4000	154.5400
	457.5375	468.3875
	457.5500	467.7750
	460.8875	465.8875
	461.0375	466.0375
	461.0875	466.0875
	461.5375	466.5375
	464.9625	469.9625
	469.0125	464.0125
	469.2125	464.2125
Taco Bueno	30.8400	154.5700
	461.3125	466.3125
Taco Cabana	33.4000	154.5400
TCBY	457.5500	467.7750
Tim Hortons Donuts (Canada)	30.5800	UNKNOWN
	457.5750	467.9750
Wendys	31.0000	171.3050
	33.1600	154.5150
	33.4000	154.5400
	35.0200	154.6000
	49.8300	49.8900
	457.5125	467.7375
	457.5375	467.7625
	457.5375	468.3875
	457.6125	467.8375
	460.8875	465.8875
	461.0875	466.0875
	461.8125	466.8125
	462.1625	467.1625
	464.9875	469.9875
	469.0125	464.0125
	469.2125	464.2125
Whataburger	30.8400	154.5700
	457.5250	467.8250
	457.5500	467.7750
	457.6000	467.7500
	457.6125	467.7500
	469.0125	464.0125
	469.0375	464.0375
	469.0625	464.0625
	469.0875	464.0875
	469.1125	464.1125
	469.1375	464.1375
	469.1625	464.1625
	469.1875	464.1875
	469.2125	464.2125
	469.2375	464.2375
	469.2625	464.2625
	469.2875	464.2875
	469.3125	464.3125
	469.3375	464.3375
	469.3625	464.3625
	469.3875	464.3875
White Castle	457.6000	467.8250
	461.8125	466.8125
Weinerschnitzel	33.1600	154.5150

Customer —Clerk	Restaurant Chains
NONE — 49.8300	Sheetz (Gas Station)
30.4000 — UNKNOWN	Taco Bell(Canada)
30.5800 — UNKNOWN	Tim Hortons Donuts(Canada)
30.5800 — 154.4900	McDonalds(Canada main freq)
30.8400 — 151.6700	McDonalds(Canada aux. freq)
30.8400 — 154.1450	McDonalds(Canada aux. freq)
30.8400 — 154.5700	Arbys, Bobs Big Boy, Burger King, Burgerville, Carls Jr, Dairy Queen, Dunkin Donuts, Hardees, Hot Dog Etc, Kentucky Fried Chicken, Mrs Winners Drive-up, McDonalds, Rallys, Roy Rogers, Taco Bell, Taco Bueno, Whataburger
31.0000 — 170.3050	Arbys, Braums, Burger King, Chick Fil A, Coulters BBQ, Foster Freeze, Hardees, Hot Dog Etc, Kentucky Fried Chicken, McDonalds, Taco Bell, Wendys
33.1400 — 151.8950	Hot Dog Etc, Kentucky Fried Chicken, McDonalds
33.1400 — 170.3050 *	McDonalds
33.1600 — 154.5150	Boston Market, Dunkin Donuts, Kentucky Fried Chicken, Long John Silvers, Rallys, Roy Rogers, Sonic, Taco Bell, Wendys, Wienerschnitzel
33.4000 — 154.5400	Boston Market, Burger King, Dunkin Donuts, Jack in the Box, Kentucky Fried Chicken, Long John Silvers, McDonalds, Popeyes, Roy Rogers, Taco Bell, Taco Cabana, Wendys
33.4000 — 154.5700 *	McDonalds
35.0200 — 151.8950 *	McDonalds
35.0200 — 154.4900 *	McDonalds
35.0200 — 154.6000	Hardees, Jack in the Box, Kentucky Fried Chicken, McDonalds
35.1000 — UNKNOWN	G.D. Ritzys
49.8300 — 49.8900	Wendys
151.7150 — 169.4450	McDonalds
151.7450 — UNKNOWN	McDonalds (Most likely paired with 169.505, 171.045, or 171.845)
151.7750 — 171.9050	McDonalds
151.8650 — UNKNOWN	McDonalds (Most likely paired with 169.505, 171.045, or 171.845)
154.5700 — 170.2450	McDonalds
154.6000 — 171.1050	McDonalds
457.5125 — 467.7375	Wendys
457.5250 — 467.7500	PROBABLE FREQUENCY none found yet
457.5250 — 467.8250 *	Whataburger
457.5375 — 461.0875 *	McDonalds
457.5375 — 467.7625	Bess Eaton Donuts, Hardees, Roy Rogers, Wendys
457.5375 — 468.3875 *	Carls Jr, Kentucky Fried Chicken, Rallys, Taco Bell, Wendys



TABLE 3
Fast Food & Gas Station Frequency Pairing by Frequency

457.5500 — 467.7750	Arbys, Burger King, Carls Jr, Dunkin Donuts, El Pollo Loco, McDonalds, Taco Bell, TCBY, Whataburger
457.5625 — 467.7875	Burger King
457.5750 — 467.8000	Country Style(Canada), Jack in the Box, Burger King
457.5750 — 467.9750	Bakers Dozen Donuts(Canada), Tim Hortons Donuts(Canada)
457.5875 — 467.8125	Kentucky Fried Chicken
457.6000 — 467.7500	Braums, Whataburger
457.6000 — 467.8250	Arbys, Bobs Big Boy, Burger King, Kentucky Fried Chicken, McDonalds, White Castle
457.6125 — 467.7500 *	Whataburger
457.6125 — 467.8375	Wendys
460.8875 — 465.8875	Burger King, Carls Jr, Dairy Queen, Hardees, Kentucky Fried Chicken, McDonalds, Taco Bell, Wendys
461.0375 — 466.0375	Arbys, McDonalds, Taco Bell
461.0875 — 466.0875	Braums, Carls Jr, Dairy Queen, Hardees, Kentucky Fried Chicken, McDonalds, Rallys, Taco Bell, Wendys
461.1125 — 466.1125	Hardees
461.2875 — 466.2875	Burger King
461.3125 — 466.3125	McDonalds, Taco Bueno
461.5375 — 462.1625 *	Rallys
461.5375 — 466.5375	Braums, Dairy Queen, Burger King, Taco Bell
461.8125 — 466.8125	Wendys, White Castle
462.1625 — 467.1625	Braums, Dairy Queen, Hardees, Kentucky Fried Chicken, McDonalds, Wendys
462.7625 — 467.8875 *	Kentucky Fried Chicken
463.2875 — 468.2875	McDonalds
463.9875 — 468.9875	James Coney Island
464.0875 — 469.0875	Kentucky Fried Chicken
464.5125 — 469.5125	McDonalds, Wendys
464.9625 — 469.9625	El Mexicano, Taco Bell
464.9875 — 469.9875	Wendys
469.0125 — 464.0125	Bobs Burger Express, Hardees, Kenny Rogers Roasters Chicken, McDonalds, Popeyes, Rallys, Roy Rogers, Sheetz (Gas Station), Taco Bell, Wendys
469.0250 — 464.0250	Jack in the Box
469.0375 — 464.0375	Bobs Burger Express, Whataburger
469.0625 — 464.0625	Bobs Burger Express, Whataburger
469.0875 — 464.0875	Bobs Burger Express, Whataburger
469.1125 — 464.1125	Bobs Burger Express, McDonalds, Whataburger
469.1375 — 464.1375	Bobs Burger Express, McDonalds, Whataburger
469.1625 — 464.1625	Bobs Burger Express, McDonalds, Whataburger
469.1875 — 464.1875	Bobs Burger Express, McDonalds, Whataburger
469.2125 — 464.2125	Bobs Burger Express, Taco Bell, Wendys, Whataburger
469.2375 — 464.2375	Bobs Burger Express, Whataburger
469.2625 — 464.2625	Bobs Burger Express, Whataburger
469.2875 — 464.2875	Bobs Burger Express, Whataburger
469.3125 — 464.3125	Bobs Burger Express, McDonalds, Whataburger
469.3375 — 464.3375	Bobs Burger Express, McDonalds, Whataburger
469.3625 — 464.3625	Bobs Burger Express, Whataburger
469.3875 — 464.3875	Bobs Burger Express, McDonalds, Whataburger
469.2125 — 464.2125	Wendys
469.9250 — 464.9250	Roy Rogers
920.2625 WFM - UNKN	Dairy Queen(Canada)
920.2875 WFM - 903.2875	Kenny Rogers Roasters Chicken
920.5000 WFM - 903.5000	McDonalds
920.7250 WFM - 903.7250	Arbys
920.7375 WFM - UNKN	Coffee Time(Canada)

* Odd frequencies pairing

TABLE 4
(CTCSS) PL Tones used

Outside	Inside	Outside	Inside
77.0	162.2	114.8	107.2
88.5	123.0	114.8	127.3
100.0	131.8	156.7	
162.2		162.2	173.8
107.2	141.3	114.8	127.3

Broadcasting Bedfellows

Recalling the Unusual Alliance between Radio New York Worldwide and the Drake SW-4(A)

By Richard A. Seifert

One of international broadcasting's most interesting stories involves a cooperative agreement between a receiver manufacturer, the R.L. Drake Company, and commercial shortwave station WRUL-WNYW, Radio New York Worldwide. This agreement led directly to the introduction of a new receiver in 1966, and is fairly unique in the annals of independent broadcaster/manufacture cooperation and collaboration.

The story begins in 1931. It was during this year that a young engineer named Walter S. Lemmon saw his dream come to fruition. Lemmon, a radio enthusiast and inventor who had served as a radio officer to President Wilson in Versailles in 1919, had a vision of an international broadcast station whose purpose was to promote international goodwill. His invention and sale of a "single dial tuning control" to RCA in 1931 provided the funds to see his dream become a reality.

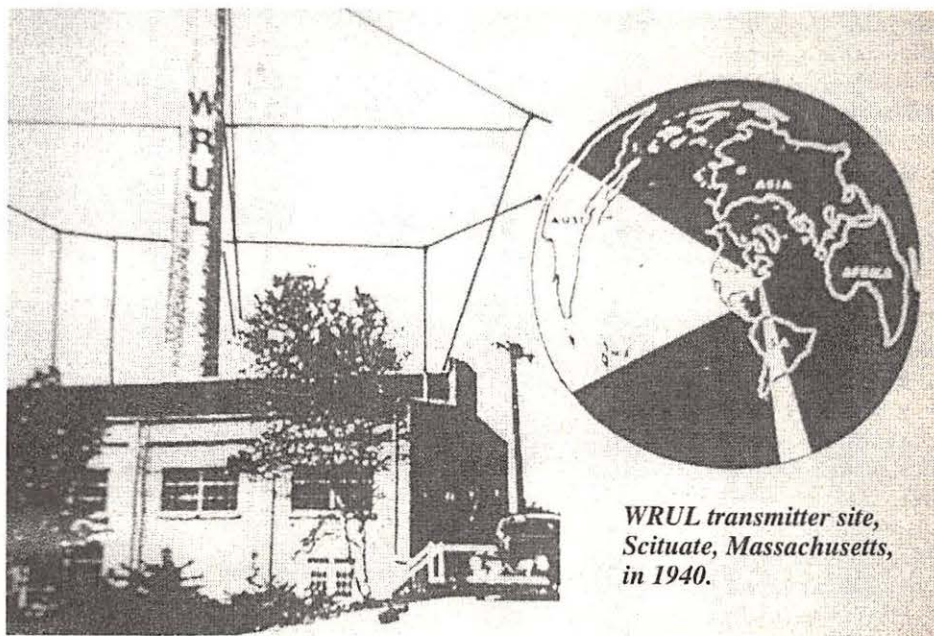
Lemmon began experimental shortwave station WIXAL in Boston, shortly after the sale of his invention in 1931. Four years later, he founded the World Wide Broadcast-

ing Foundation and began transmitting lectures via WIXAL from noted professors from Harvard, Tufts, Boston University, and other nearby institutions. All programming was non-commercial, and educational or cultural in nature.

In 1939 the Federal Communications Commission assigned standard call letters to United States shortwave stations, removing them from "experimental" status. WIXAL was assigned the call letters WRUL, which stood for "World Radio University," with the "L" implying listeners. Radio courses in engineering, aviation, languages, and music were broadcast to Europe and South America.



R.L. Drake SW-4A receiver was custom ordered by WRUL to build an audience.



WRUL transmitter site, Scituate, Massachusetts, in 1940.

WRUL continued its broadcasts to Europe and South America in eight languages until 1942. The programs were also rebroadcast in the United States over an informal network of over 300 stations, including WNYC in New York City. Programs were picked up via shortwave by these stations, and then rebroadcast over their local facilities. During this period, the station expanded its transmitter installation in Scituate, Massachusetts, adding new antenna systems and transmitters.

WRUL was turned over to the United States government in November of 1942, as were all United States shortwave stations, under a lease agreement. This lease stipulated that all programming would be supplied by the government, who would pay for the station's time and operating expenses.

■ Post-War Programming

After the war, Lemmon and WRUL fought for and won limited return of their station from the government. The fiscal appropriation act of 1947 allowed shortwave broadcasters to again program their stations, but only for 25 percent of the time. WRUL was the only US shortwave operation that took advantage of this opportunity.

In 1954 the government lease with WRUL ended, and the station was allowed to resume one hundred per cent independent programming. These efforts continued until 1960 when Lemmon, now in his 60's, sold the station to group media owner Metro Media. Metro Media continued to offer similar programming, but found little commercial success, and divested itself of WRUL in 1962. Enter the International Educational Broadcasting Corporation, a division of the LDS (Mormon) church.

When the church purchased WRUL in June of 1962 from Metro Media (during the height of the cold war), its intent was to promote and exemplify the American free enterprise system as well as international good will. Under the visionary leadership and direction of general manager Arch Madsen, WRUL invested heavily in promoting and developing the station.

Madsen realized that the success of the operation hinged on cultivating a worldwide shortwave audience. Under Walter Lemmon's World Wide Broadcasting Foundation, and later, under Metro Media, WRUL had established an excellent reputation for educational/cultural programming, but the audience was small and migrating to other media.

■ Equipping the Audience

The new owners of WRUL wanted to operate the station as a commercial enterprise. This meant that the established but dwindling audience needed to be expanded. Madsen opined that, while the interest in shortwave was there and the potential listenership was larger, the apparatus for easy general reception was not. That is to say, general coverage receivers were difficult to operate. For example, a Collins R-390A would make programming today's VCRs child's play for the technically challenged. Also, these receivers tended to be primarily in the domain of DXers, ham radio operators, or hobbyists. Further, with the popularity of AM radio throughout the 50's and 60's, receiver manufacturers concentrated their efforts in this arena, all but abandoning shortwave. The days of the grand old AM/SW console radios of the 40's and 50's were gone.

The challenge then for establishing a successful commercial shortwave station was three-fold:



WRUL founder Walter S. Lemmon (second from left).

- 1) provide programming that the general worldwide public would want to tune in for extended periods;
- 2) provide the means to easily receive it, and having done that;
- 3) advertise both the station and the receiver.

For the programming, WRUL adopted a format featuring popular American music of the time presented by air personalities, along with informational programs describing life in the United States. Listeners to the station heard such currently popular artists and groups as The Fifth Dimension, and Donovan. A program called *Mel in Manhattan* provided snippets of American life. 15,440 kHz was becoming a popular frequency throughout North and South America and Europe. WRUL was receiving over 3,000 letters a month from listeners around the world. An audience base was beginning to build.

The second step, an easy-to-use receiver, then became priority number one. WRUL's general manager Arch Madsen, himself an electronics engineer, decided to define the parameters for a shortwave receiver that would be easy to use, as well as inexpensive. Further simplifying operation, Madsen came up with the idea of color coding. All the listener would have to do is "match colors" to operate the receiver.

The next step was finding someone to build it. The R.L. Drake company of Miamisburg, Ohio, had a well-established reputation as a leading manufacturer of amateur radio receiving and transmitting equipment. The 2-B and the R-4/T4X combination,

among others, were highly valued in the amateur radio community. Madsen approached Bob Drake about producing this receiver requiring little technical knowledge to operate.

It was to be a low-cost unit (at or around \$200 US), AM mode only, capable of receiving all international broadcast bands, as well as medium and long wave. It would have an AGC circuit, adequate selectivity and sensitivity, and a minimum number of front panel "knobs" requiring user adjustment. Importantly, the receiver should also provide pleasant audio quality. In short, it was to be as simple to operate as possible. Drake considered the proposal and agreed to proceed, sensing a possible new worldwide market opportunity.

Drake engineers, led by chief engineer Milt Sullivan, worked with Madsen in the development and creation of the receiver. It would be Drake's first entry into the general coverage, non-ham market. The result was the SW-4, a tube receiver featuring a "push-pull" audio stage for pleasant audio, fitting the specifications prescribed by WRUL.

Because the receiver was made to WRUL's specifications and request, Drake agreed to include the station's logo on the front panel. The agreement would be beneficial to both companies. R.L. Drake company and the SW-4 were to be promoted over the air by WRUL. WRUL, on the other hand, would have its logo on the receiver as a constant reminder to the shortwave audience, as well as the added bonus of having its call letters appear in Drake's print advertising, thus exposing it to

a whole new market of shortwave listeners who may not have been aware of the station.

1966 was an important year in the SW-4/WRUL story. As the Drake company progressed with final assembly of the SW-4, WRUL was busy as well. The call letters WRUL had been in existence since 1939, and were inexorably tied to Walter Lemmon's Worldwide Broadcasting Corporation. That meant that listeners still associated the call letters with educational/cultural non-commercial programming.

To promote the new sound of the station, in conjunction with the debut of the SW-4, the WRUL call was dropped in favor of WNYW, Radio New York Worldwide. The slogan "Radio New York Worldwide" had been used since 1962 when the station was purchased by the LDS church. Also, WNYW received a construction permit from the Federal Communications Commission to change its transmitter location from Scituate, Massachusetts, to Chatsworth, New Jersey. Included in the permit was authorization to install two 250 kW, one 100kW, and two 50kW transmitters.

The SW-4 hit the market in 1966. Each receiver was hand made at the Drake facility, every solder connection being done by hand. For this reason, a production of five to ten receivers a day was considered normal. Approximately 600 SW-4's were built before the introduction of the "A" model. The primary difference between the "A" model and the SW-4 was the addition of a solid state audio section, replacing the "push pull" tube design.

Per agreement, WNYW began promoting the existence of this easy-to-use shortwave receiver over the air. It began to appear in print advertising, as well as amateur radio outlets. The promotion touted the receiver's coverage of the existing international shortwave bands as well as its simplicity of operation. Anyone could use this receiver, the spiel went: No need to be technically minded.

Everything seemed to be falling into place. The receiver was now available. Programming was gaining acceptance, and transmitter facilities were about to be improved. However, the goal of increasing listenership via an easily operated receiver was never realized. The WNYW/Drake cooperative agreement continued for seven years, until 1973. WNYW continued to operate as a commercial entertainment shortwave station, but found it increasingly difficult to attract sufficient sponsorship.

WNYW learned what other shortwave broadcasters have discovered, both before



Radio New York WorldWide (WNYW) logo as it appeared on the front of the SW-4.

and since: the difficulty of measuring the size of the listening audience. Therefore, even though the station was popular among DXers, hobbyists, and listeners worldwide, it wasn't able to make a case for the size of its audience. Without this information, commercial sponsorship was difficult to obtain. The station also met with resistance from foreign commercial enterprises who complained that the station was taking advertising business away from them.

In addition, WNYW encountered a "lack of understanding" among potential advertisers as to just what the station was trying to do with international shortwave radio. A fire at the transmitter facility in Massachusetts in 1972, followed by the expense of rebuilding the site, proved to be more than the station could handle.

Receiver sales were encouraging, but did not fulfill the intended goal of increasing listenership, at least to the extent that would sway advertisers. WNYW had hoped to market them mainly in Europe and South America, but found that the greatest interest was largely in the United States. The WNYW overseas target audience was largely missed. However, because of encouraging interest in the SW-4A, Drake went on to develop and introduce the SPR-4 general coverage receiver, featuring SSB capability and greater frequency coverage.

The story concludes in 1973 with the sale of WNYW, Radio New York Worldwide, to Family Radio Inc., a group religious broadcaster. The WNYW call was changed to WYFR ("your family radio"). WYFR continues broadcasting today from their transmitter site in Florida.

■ Postscript

Last year, I had an opportunity to tour the new facilities of National Public Radio here in Washington, D.C. Located in the District's "Chinatown" neighborhood, NPR features state-of-the-art digital workstations, mixing facilities, and impressive studio layouts.

As we walked through the several-story building, we eventually made our way to the technical area filled with satellite downlinks, digital switching matrixes, rows of neatly bundled cable. Then, something caught my eye. There, located on a shelf which was rack-mounted about three feet off the floor, sat the glowing face of a familiar old friend. Tuned to WWV at 10 MHz, was an SW-4A.

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The \$100 Ham Station

Okay, you've finally listened to all my periodic tirades about the joys of amateur radio. You've followed my directions about studying and testing. You've received that magic piece of paper from the FCC that authorizes you to hit the airwaves with all the other hams. Congratulations, you've worked hard and you've earned your privileges.

Now what? Oh, yeah; you need equipment.

If you look at the ads in the back of any popular amateur radio magazine you will quickly discover that some ham gear can be a bit on the pricey side. This goes especially for all those "bell and whistle" laden handheld transceivers geared to the new ham market. Can you drop a couple of grand on a ham station? You bet. Do

you *need* to spend that much money? No way! It is possible to enjoy amateur radio for very little money. Let me also quote another of Uncle Skip's laws: *The Less Money You Spend, The More You are Likely to Learn.*

The reason for this is that some aspects of lower cost operating can involve building your own equipment. Don't let this scare you off, Compadre, but I won't steer you down that road just yet. First I'm going to

give you some hints that any beginner can use to get on the air on the cheap. We'll take a look at both VHF and HF possibilities, depending on which class of amateur license you started off your ham career with.

■ The Cheap Technician

The "No Code" Technician's class license is by far the most popular route into the world of amateur radio today. It's a neat way to go, giving the operator the whole VHF amateur spectrum to play with. But as I alluded to earlier, you may have the desire and drive to be a ham, but you may not have the bucks to buy that \$400- \$600 class transceiver to get on the air. This is not a problem; it's really an opportunity. You see, in the world of amateur radio, a lot of folks sell off older equipment because they cannot resist the latest high tech toys on the market. Their addiction is the beginning ham's opportunity.

A trip to any amateur radio flea market or swap meet is going to turn up some good deals on used VHF transceivers. Digital synthesis frequency systems for amateur radio VHF gear really came heavily into the

market in the mid-seventies. VHF operation before this time depended on "crystal controlled" transceivers. Instead of punching a few buttons to put a radio on a frequency you had to plug in the appropriate crystals.

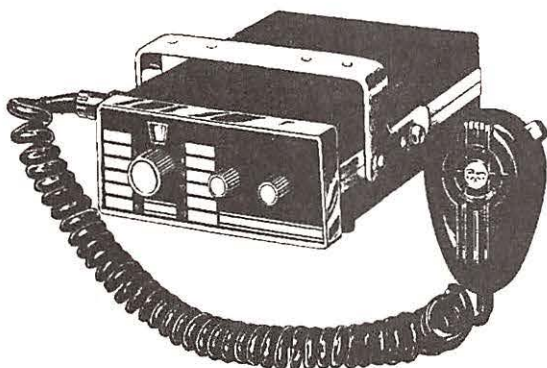
Admittedly, this may sound a bit primitive compared to the latest and greatest gear. However, these crystal age rigs can be found at hamfests for as little as \$50. All you need to do to take advantage of such equipment is to adjust your thinking a bit. Ask yourself the question: How many 2 meter repeaters are within range at my location? Practically speaking, it will be less than 10 systems.

Now move that thinking a little further. You probably will initially settle in on one or two local systems where you find folks who share your interests. Perhaps you obtained your license by taking classes at your local ham club. Obviously the club repeater would be your base of operations once you get on the air. So with these parameters established, a rig with positions for 6 or 8 crystals should meet your needs. Of course some of these older "rock bound" transceivers have twenty or more crystal positions, so you can expand your operation quite a bit.

Now it's time to go shopping. Rigs to watch for include the Drake TR-22 and TR-33C, ICOM IC-21A and IC-22A, Spectrum Communications SPEC COMM 512 and SPEC COMM 560, Regency Electronics HR-6, and HR-212, Standard Communications "Horizon 2," Henry Radio's TEMPO CL146A, and the Genave GTX-2, GTX-10. I still use a Drake TR-33C as my main shack transceiver for net and packet operations. It's been in continuous use since 1976 and I wouldn't trade it for anything.

However, many hams are more than willing to let go of their older gear, so cruising the hamfests in your area should turn up a few choice rigs. Picking up a transceiver in this class from a hamfest near where you live might even turn up a unit that has crystals for local repeaters already installed. That saves you making any additional purchases, even though crystals are relatively inexpensive devices.

You would think that crystals would be hard to come by these days. Not so. At least half a dozen sources are out there advertising their wares in amateur radio magazines. Two that have a good history are International Crystal Manufacturing Co., Inc. PO Box 26330, 10 North Lee, Oklahoma City, OK 73126 (800) 725-1426; and Jan Crystals, PO Box 06017, Ft. Meyers, FL 33906 (800) 526-9825. You may be interested to know that these folks can also supply you with crystals for older



Fine old crystal controlled receivers such as this Regency unit are an inexpensive route to two-meters.

scanners. I keep an old Bearcat IV in my kitchen to keep an eye on local public safety operations.

Remember the basic rules of hamfesting. Check the unit over carefully. Try to hear it on the air. With older gear, *always* get a manual or know where to locate one. On these older 2 meter rigs, don't let a rough looking outer case turn you off. Many of these rigs spent a lot of time "in the field" or getting swapped in and out of cars. Under that rough exterior may lurk a real prize once you turn the unit on.

Cheap transceivers almost beg for equally cheap antenna ideas. Most repeaters within a ten or fifteen mile radius will not require an expensive or complicated antenna. A simple dipole cut to frequency and hung vertically at the second story level should work.

Dozens of inexpensive antenna designs can be found for the 2-meter band. A recent book entitled *Vertical Antenna Classics*, edited by Robert Schetgen KU7G, published by the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494 (860) 594-0200, ISBN 0-87259-521-8, contains many VHF antenna designs that can be assembled out of simple wire and inexpensive metals.

Within these boundaries, a station can easily be assembled for under \$100 by any enterprising new Technician Class ham. You may not have the newest rig on the block, but you'll be on the air and that's what this aspect of the radio hobby is really all about.

■ Poor Person's HF Station

Now here I'll turn to a bit of personal experience. I've taken an interest in low power operation lately. QRP HF kits are all over the pages of most amateur radio magazines these days. We'll talk more about these kits in a few minutes, but since we're already at the hamfest, let's look around. At a nearby hamfest I recently discovered a Heathkit HW-8 QRP transceiver. This fine little rig gives the operator low power CW access to the 15, 20, 40 and 80 meters amateur radio bands. I'd owned one of these rigs in my early ham years and enjoyed it thoroughly. My only mistake was selling it. Now I had a chance to get another one.

I've seen this rig go for as high as \$150 dollars, as it is somewhat sought after by low power enthusiasts. Well, this day I was lucky. The seller initially wanted \$100 but I tried not to look too interested and walked away for about half an hour (one of the harder things I've ever done). I came back and offered him \$75. He agreed and the deal was done. I now had the low power rig I wanted.

A little bit further down the lot, I spotted a small random wire antenna tuner for \$10. Another table revealed an inexpensive "CB" SWR bridge for \$5. I had plenty of wire and connectors at home in my junk box, so I still had \$10 to purchase some new coaxial cable to connect the transceiver, the tuner, and the SWR bridge together. Now I have a complete ham station to take along on my family camping trips. So you see, \$100 can go pretty far if you pay attention to the swap meet tables and are a bit shrewd in your dealings.

If you're not interested in low power, you may still be able to get an HF ham station going for under \$100. The difference here, though, is that we must assume you already have a receiver capable of covering the amateur radio bands. Higher wattage CW transmitters designed for Novice class use in the 1960s can be found for well under \$100. Two units to keep an eye out for are the Heathkit DX 100 and the Viking Ranger. I'm in the process of restoring a classic DX-100 and I'm having a ball. I picked the unit up in working condition for \$25 as part of another deal. You're not going to find 140 watts CW for that price everyday. True, you'll have to scrounge tubes and maybe melt a little solder along the way to keep these old rigs humming, but you'll never find a better way to learn the basics of transmitters.

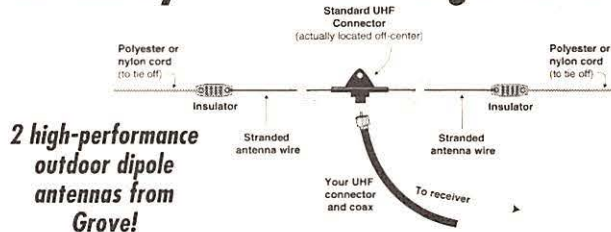
I mentioned earlier that there are kits available to allow a ham to get on the air for fairly low cost. Kit building has experienced a real resurgence in the last year or so, particularly in the area of low power amateur radio HF transceivers. Several of these designs meet the under-\$100 criteria I have set for this article. Small Wonder Labs, 80 E Robbins Ave, Newington, CT 06111 (860)-667-3536, makes a kit called the Green Mountain 20. This unit is available in either 40, 30, 20 or 15 meter versions. It costs just \$75 dollars postpaid. Since it is what is known as a "board only" kit, you have to supply the case and a few small parts that can be found at any Radio Shack or in any reasonably stocked junk box. You should still have no trouble getting this rig on the air for under the \$100 budget I've set for this column.

By the way, if you're already an active ham but don't own a transceiver that covers the 30 meter WARC band, a kit such as this will get you onto one of the hottest CW bands going. If you already own a shortwave receiver that covers the amateur radio bands, you can get on the air for even less money. Sescom, Inc., 2100 Ward Drive, Henderson, Nevada 89015-4248 (800) 634-3457 sells a low power transmitter kit called the Micronaut. This unit can be built for the 80, 40, 30 or 20 meter bands and can be purchased for the princely sum of \$15 complete with case and connectors. No, I didn't leave out any zeros. This kit gives you access to HF amateur operation for less than the cost of a trip to the movies with your significant other, including a large popcorn.

If you really want to experience ham radio in the raw, you can go the "home-brew" route. Thousands of construction articles have been published over the years in magazines and books such as the *ARRL Handbook* that chronicle how to build transmitters, receivers and transceivers. Many of these construction projects are even geared specifically to get beginners to try their hand at building their first ham station. There is no greater pride than telling the ham on the other end of a QSO that the rig on your end is "something I built myself."

Have fun. This is a hobby, and a chance to learn something along the way. I'll be listening for you in the QRP portions of the ham bands. Keep an eye out down there for Rich Arland, K7YHA, and Ike Kerschner, N3IK, too, while you're at it.

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Bunking with Trunking — Again

"Bunking with Trunking" may likely become a monthly topic here in the Scanning Report. New trunking systems are constantly being established, and trunking—along with some early implementation of digital—is undeniably the most critical topic amongst scanner hobbyists today.

Once your city, county, or state has gone trunked, the monitoring challenge certainly increases. However, we've stated it before and we'll state it again: Trunked systems can be monitored with knowledge and patience. You will not hear every bit of particular conversations, but you will hear the gist of any important goings-on. Don't let trunking get you down and deter you from your hobby. If you are both a hobbyist and a responsible citizen who helps the police by monitoring their transmissions, try not to give up an honorable pastime simply because your local PD made the switch to 800 trunked.

Trunking doesn't have to wipe out scanner listening. And let's hope that scanner manufacturers will one day be able to help us overcome those inherent problems that trunking presents.

Other articles have delved into the best way to monitor trunked systems. Gene Hughes' excellent introduction to *Police Call* also provides a very understandable and straight-forward report on how trunking systems work and how best to monitor them.

While we do not want to take up a lot of space explaining how trunked systems work, here are some basic tenets of monitoring a trunked system that you may find helpful:

Monitor at Night and on Weekends

If all public safety and public service agencies of a city or county use a trunked system, this will make it very difficult to follow the communications you most want to hear: those of the police, fire or emergency medical service departments. Monitoring at night and on the weekend can help. After the regular workday, the garbagemen, sewer workers, building inspectors, school administrators, van drivers for the elderly, and other city workers that you're probably not that interested in monitoring will be off the air. Police, fire and EMS activity will dominate the airwaves.

Delete the Control Channel

On both GE/Ericsson and Motorola trunked radio systems, a single control channel will command a multitude of voice channels. On Motorola systems, control, or data, channels typically change once a day, but may change more or less often (although generally not more than once every 12 hours). You can lock out these data channels, but once the data channel changes, you must be sure to unlock the previous data channel, which will now be used for voice communications. Data channels are changed so that repeaters that broadcast the continuous streams of data do not burn out.

In the past, it had appeared to us that on the GE/Ericsson systems the data channels changed rather infrequently. Now we see the data channels constantly changing, making monitoring GE systems trickier.



Photo by Mark Swatrick

New trooper cars await installation of radios at Motorola.

High-to-Low or Low-to-High Channel Plans

Often trunked system voice activity will occur in logical steps. Take the example of a small five-channel trunked system with the following frequencies: 856.9875, 857.9875, 858.9875, 859.9875, 860.9875. On Motorola systems, one of the frequencies on the higher end of the scale will almost always be used for the control channel. If 860.9875 is used for control, voice traffic may be assigned first to 859.9875, then to 858.9875 if 859.9875 is busy, and so on. Frequency assignment may also work in reverse, with the first assigned voice channel being 856.9875. And, oftentimes, voice channel assignment can appear to be completely random.

Other Data Activity

As trunking systems become more entrenched, new ways to take advantage of talkgroup ID's are becoming evident. Mobile data terminal transmissions are no longer exclusively the domain of a distinct frequency. On some systems, MDT communications are now broadcast over the trunk. Here in Massachusetts, water-meter data from the state Water Resources Authority (MWRA) is transmitted over the State Police trunked system.

These data transmissions, which are totally unintelligible and meaningless to the listener, muck-up the works when you try following conversations. Other data sounds include encrypted, digital-voice communications (usually employed only by special entry and detective units).

Last, but certainly not least, are those apparently anti-scan noises on the GE/Ericsson systems, including buzzsaws and beeps, which can make listening unbearable. Two aftermarket boards which we have mentioned in the past are available to help the scanner recognize and skip over non-voice transmissions in GE/Ericsson and Motorola systems.¹

Another way to eliminate much of the data is to only monitor the input channels of a trunked system; however, this method will allow

you to hear only one side of conversations. (You will almost never hear the dispatcher, anyway, as that side of the communications is generally always hard-wired to the transmitter site.) You will also have to be very close to the mobiles or portables to hear them.

■ Trunking Mail

An anonymous reader from Alabama sent us the following eye-opening, jaw-dropping, and thought-provoking letter:

"In response to your inquiry in the May issue of *Monitoring Times* regarding the use of trunked systems around the country, below is some information and observations on Huntsville, Alabama:

1) The system is a Motorola Type 2 system. It currently uses (has licensed) 41 frequencies. [Editor's note: These 41 frequencies are comprised of 20 input and 20 output frequencies. The input side to an 800 MHz trunked system is always exactly 45 MHz below the output. It is unclear what the 41st frequency is used for.]

809.0125 809.0625 809.5375 809.9625 810.2125
810.2375 810.7125 810.9625 811.2375 811.4375
812.2375 812.7375 813.4375 814.2625 814.7125
815.9875 854.0125 854.0625 854.5375 854.9625
855.2125 855.2375 855.7125 856.2375 856.4375
857.2375 857.7375 858.4375 859.2625 859.7125
860.2625 860.4375 860.4875 860.7125 860.9375
860.9875

2) The Huntsville Police Department, Fire Department, and the city's Animal Control Department are currently on the system.

3) The plans are to include all of the city departments on the system after the system becomes a little more stable.

4) Only two tower sites are used, with one on the north end of the city and one on the south end.

5) No digital communications have been heard on any of the channels (except, of course, the control channel). The control channel changes on a weekly basis, usually on Sunday night.

6) The problems with the system have been unbelievable. The system "crashes," resulting in a complete loss of communications. Police units frequently—and, unfortunately, unintentionally—get to talk to the fire dispatcher. One unit often cannot talk directly with another unit, with the result being that the poor dispatcher has to "10-5" (relay) all of the radio traffic between units. This gives everybody, especially the dispatchers, what I call a "wet hornet" attitude about two hours into the shift.

The range of the radios is severely limited. The police department and the sheriff's department have a "mutual aid" agreement, and police units often travel way out into the county to assist deputies. When they do this, their radios are totally useless.

The mutual aid program has also suffered because the deputies, in addition to the airport police, local university police, FBI, Secret Service, and the like, all used to monitor HPD's radio traffic in order to be able to offer assistance and to follow the progress of certain situations. Now, all of this coordination has to be handled by phone. When a local FBI agent was recently asked by his dispatcher if he was

monitoring a bank robbery situation in Huntsville, he caustically remarked, "Negative, I am no longer equipped to monitor their radio traffic."

HPD's move to a trunked radio system has also further alienated the department from the public. Now, the few people that were left that really wanted to help the department cannot do it anymore. One dispatcher confided that, under the old radio system, when they gave out a "BOLO" (Be on Look-out) over the air for a person or vehicle, they would sometimes get thirty or forty calls from scanner listeners, or from officers from other agencies who were monitoring. Under the new 800 system, they (the Huntsville PD) get nothing. The public's perception of the new 800 system is that the department is trying to hide something.

The reaction of city administrators has been total silence and a total unwillingness on the part of anybody to discuss the problem. [Editor's note: We were able to speak with someone at Huntsville Police on-the-record about the problems.] The switch to trunking was totally unnecessary. The old VHF system (in the 154 and 155 MHz range) worked great up until the very day that it was abandoned. Units would often travel to Birmingham (about 90 miles away) and call the dispatcher on the radio to let them know that they were checking out down there!

Sure, radio traffic had increased on the three frequencies as the HPD grew, but that could have been easily (and cheaply) solved by their just requesting a couple more frequencies from the FCC. Huntsville's airways are not exactly radio-saturated on VHF.

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[Editor's note: Finding new VHF and UHF frequencies that are available for licensing can be sometimes be the problem that initiates the shift to 800 MHz — although frequencies are now hard to find on 800 as well.]

8) There is no simulcasting going on in Huntsville. However, here is an interesting note: Since the police officers were having such a hard time with the new system and could not talk to each other, they came up with a solution. Being the resourceful and imaginative individuals that they are, they all went to Radio Shack and bought CB radios (with their own personal money, I should add). Radio Shack, being the community-minded company that it is, did give them a discount when it discovered what was going on.

Isn't that incredible? The city spent 4.5 million dollars on an unneeded radio system and our police department is using CB radios. So now, if you want to monitor the local police, you don't need a fancy 800 MHz scanner, just dig out that old CB radio. But please show some *Monitoring Times* courtesy and just listen and enjoy. Don't key-up on them or bother them in any way, because if you do, you'll ruin it for the rest of us.

Actually, the local CBers have handled it pretty well and they stay off the two CB frequencies that HPD uses (hey, there's 38 other channels). [Editor's note: If anyone knows the two CB channels, please write in. The author of this letter failed to mention them.] They (the HPD) are also bringing a level of professionalism to the CB channels which seems to be spilling over onto the other channels (with exception of channel 19, which is as redneck as ever).

Sorry I can't sign my name to this, but I have to work with these people and I don't want the Mayor or the Police Chief mad at me."

While this letter may contain certain facts, other aspects of the letter are clearly this subscriber's opinions. We did not want to print accusations, particularly not from an anonymous reader, without allowing the Huntsville Police an opportunity to respond. On June 13th, we called the Public Information office of the Huntsville Police Department. Officer Gilbert was open and courteous—something we don't always experience when we approach a police department as a scanner hobbyist.

After we confirmed with Officer Gilbert that, yes, Huntsville had switched to a trunked 800 MHz system last September/October, we just had to verify, or dispel, the myth that beat officers had actually purchased CB radios for communications. "Oh, yes, that's right," was Gilbert's matter-of-fact response. According to this officer, because the police must monitor the "patrol group" on the trunked system, they have no way of communicating with one another on an individual basis. Therefore, the officers did go out and purchase CB's for unit-to-unit communications.

We did not follow-up to find out if the officers actually do not want to leave the patrol group channel, have been ordered not to, or whether their radios do not allow them this capability.

When we asked if the police were having any difficulties with the system, Officer Gilbert answered that, yes, they could use "more repeaters." The city has low spots, valleys, and other terrain issues, he reported, and better coverage would improve the situation. Gilbert confirmed that the new system has caused problems with coordination on the "North Alabama Net," as stated above by our reader. Gilbert also told us that all city agencies are using the system, but he knows of no plans for other suburban or county agencies to sign-on.

Officer Gilbert assured us that the Huntsville Police have nothing to hide and he, personally, has no problem with the public listening in



on their radio traffic. He also assured us that, in time, the new system would outperform the radios that the city had replaced.

■ Reality Check

Trunking systems provide a very valuable function: They offer users the chance to load more radios onto a smaller number of channels than previously required (spectrum management), and they offer incredible communications flexibility as far as grouping users together. These are only two of the myriad other ways trunking is important and valuable.

Problems occur in the installation of almost any new radio system. Trunking may be more complex than a standard VHF simplex or duplex system, but kinks can be worked out. While scanner hobbyists would sometimes like to believe that all trunked systems are boondoggles, in actuality, for trunked systems that have been fully tested and tweaked, radio users are usually very pleased with the results and very comfortable with the investment that they have made. It is true, of course, that the "investment" was made with taxpayer dollars and some taxpayers might feel that the money would have been better spent upgrading existing systems.

We have recently heard about problems with new trunking systems in Portland, Oregon, and in Kansas City, Missouri. We will look at these situations in coming months.

■ The Digital Dilemma

We have spent a lot of time discussing trunking systems, but of course the future portends narrow-band, digital, and trunked digital systems. We have learned that Akron, Ohio, has gone digital and Cleveland will follow shortly. Digital tests are occurring in New Hampshire (one State Police troop) and in South Florida. If you are aware of proposed or actual use of these new technologies in your area, please don't forget to keep us posted.

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It's Zulu Time

One of the golden rules of utility listening is that a newcomer needs to understand that nothing is ever constant on utility frequencies. That is one thing that attracts hobbyists into listening to utility communications. Our rule is especially true when it comes to monitoring military frequencies. Be prepared for change!

As mentioned in last month's column, the U.S. military has apparently abandoned their old Papa, Sierra, Whiskey, and Xray frequency labels in favor of a new set of designators — Zulu.

On May 30, *UW* regular reporter Jeff Haverlah noted a discussion between a Global HF System (GHFS) station and an operator on one of the airborne command post regarding the frequency tables that were Zulu designated. By June 1, another *UW* regular, Bob Lewallyn, was reporting that Nightwatch 01 was discussing their net activity on the new Zulu designated frequencies. The old Papa, Sierra, Whiskey, and Xray designators have not been mentioned on any of the Nightwatch or GHFS nets since June 2.

While the reason for these new designators is shrouded in military secrecy, we can offer a hypothesis that could explain why it happened and where to look for these new frequencies/designators.

We need to step back a bit in time to the February 1995 issue of *MT*. In the *UW* column that month, we reported that the military had started the change over to 3 kHz spacing in the aeronautical off-route (OR) bands. What caused some of these military departments to change over to this new spacing? A World Administrative Radio Conference

TABLE 1: Looking for Zulu

Zulu Designators Found:			
Z135	4745.0	Z180	9057.0
Z145	5705.0	Z190	10204.0
Z150	5800.0	Z200	11181.0
Z165	6757.0	Z205	11494.0
Z170	7831.0	Z210	11229.0
Z175	9016.0	Z215	13242.0
		Z220	13245.0
Stratcom Zulu Designators mentioned on the air, but not found:			
Z120/Z124/Z125/Z160/Z185/Z211/Z235Z61			

(WARC) in Spain.

In 1992, the International Telecommunications Union (ITU) sponsored the WARC 92 plenary conference in Malaga, Spain. The final acts of that conference made a significant change to the aeronautical OR frequencies. WARC 92 finally channelized the one remaining aeronautical sub-band not previously addressed in previous ITU conferences.

■ Backing Up Further

For *MT* readers new to the utility world, the aeronautical frequencies located in the high frequency (HF) spectrum are divided into two distinct sub-bands. The first sub-

band is most familiar to HF aviation buffs — the 'R' or routed frequencies. This sub-band carries communications associated with aircraft (civilian and military) that are flying on established aeronautical routes worldwide. Communications on these frequencies consist of air traffic control, weather information, and private airline company traffic. The 'routed' sub-band was re-channelized by WARC 79 with the changes going into effect in February 1982.

The other aeronautical mobile sub-band traditionally has been more obscure to all but military monitors. Dedicated readers to the yearly Klingenfuss *Guide to Utility Stations* books will recognize the term 'OR'. Military listeners have prowled the OR sub-bands for years listening to the heavy concentration of military aeronautical traffic that occurs there. The military does a lot more off-route flying than their civilian aviation counterparts.

In the final acts of WARC 92, Appendix 26, the aeronautical mobile OR band was channelized and standardized to a frequency spacing of 3 kHz like its cousin, the routed frequencies. Administrations worldwide have until December 15, 1997, to implement the new spacing in the aero OR bands.

In our 1995 column, we also noted that some of the military services—not all—had made the changeover to the new bandplan. This is where we stand as of presstime: The U.S. Coast Guard, Royal Air Force in the UK, and the Canadian Forces have apparently complied with the new regulations. The U.S. Navy and the Air Force Mystic Star systems have not. It would appear, based on the very early research we have done into the new Zulu designators, that they were instituted by Department of Defense (DoD) to bring their strategic frequency tables in compliance with the WARC 92 final acts.

These new designators also have been discovered on frequencies outside the OR bands. It now appears that some of the old Sierra, Whiskey, and Xray frequencies outside of the aero OR bands have new names. Again, I will remind our readers that this is very preliminary based on the handful of these new designators we have discovered. You'll find the latest list in Table 1.

TABLE 2: Routed and Off-Routed Frequency Ranges

Spacing between frequencies is 3 kHz

Routed Allocations		
2850 - 3025	3900 - 3950	Region 1 only (shared service)
3400 - 3500	4700 - 4750	
4650 - 4700	4750 - 4850	Region 1 only (shared service)
5450 - 5480	5450 - 5480	Region 1 and 3 (shared service)
5480 - 5680		
6525 - 6685	5680 - 5730	
8815 - 8965	6685 - 6765	
10005 - 10100	8965 - 9040	
11275 - 11400	11175 - 11275	
13260 - 13360	13200 - 13260	
17900 - 17970	15010 - 15100	
21924 - 22000	17970 - 18030	
Off-Routed Allocations		
3026 - 3152	23200 - 23350	(shared service)

Some other interesting observations about the frequencies discovered so far include:

- Notice that Z215 (13242) and Z220 (13245) are right next to each other in the 13 MHz band separated by only 3 kHz. Also, Z205 (11494.0) is the first frequency that does not fall in numerical designator sequence with the rest of the list.
- Zulu 150 (5800), Zulu 175 (7831), Zulu 180 (9057), Zulu 190 (10204), and Zulu 205 (11494) are outside the OR bands. These frequencies are the old Stratcom W-101, W-105, S-309, W-107, and S-311 channels, respectively.
- Zulu 210 (11229) is the old X-210 designator frequency. This means that combined with the above, three of the four letter designators (Sierra, Whiskey, and Xray frequencies) frequencies are probably part of the new Zulu frequency tables. None of the Papa channels have yet to be identified as part of the new frequency tables.
- The frequencies 4745, 5705, 9016, 11181, 13242, and 13245 are new government frequency authorizations. They were not used prior to the start of the 1994 3 kHz band realignment.
- All of the new Zulu frequencies found so far have been on U.S. Air Force allocated frequencies. At presstime, no Navy or Coast Guard frequency has been discovered with a Zulu designator tag.

■ Best Guess — Where to Look

Obviously, the new OR frequencies are a good place to start looking for new designators. Listeners should also check the old Papa, Sierra, Whiskey, and Xray frequencies for Zulu frequency labels. We also recommend checking frequencies on Navy OR channels that have had TACAMO activity reported on them.

At the Grove Communications Expo in October, we will be talking about these new Zulu designators and a lot more during the *DXing the HF Utility Bands* on Sunday morning, October 20. If you have never attended a Grove Expo, it is an excellent learning experience, especially for the new ute listener. I hope to see quite a few of you in the audience on Sunday morning at the Hilton in Atlanta.

I would like to thank Jeff Haverlah, Jeff Jones, and Bob Lewallyn for all their help in putting together this first look at the new Zulu designators. The entire listening community owes one to you fellows for your hard work. How about the rest of you out there? We want to hear from you as well. You can report your new designators/frequencies via email at: steditor@grove.net or through our snail mail address: P.O. Box 98, Brasstown, NC 28902.

■ Listening to Customs

We have recently had a couple of requests asking for frequencies used by the U.S. Customs service on HF. Several years ago, Customs had an extremely active presence on utility frequencies. As the war on drugs escalated, communications were scrambled and frequencies changed. For a number of years, the FAA shared several of their inspection frequencies in the aeronautical routed bands with Customs. In 1992, Customs reached an agreement to share some U.S. Air Force frequencies. Now the Customs Service uses an automatic link establishment (ALE) network called Cothen (Customs Over-the-Horizon Enforcement Network).

We have been able to identify several of the active frequencies in the Cothen network. Based on monitoring, there are probably several frequencies that are missing from the list below. Listen for the

characteristic ALE pulses about every three to four minutes on the following frequencies:

5732.0	7527.0	8912.0	10242.0	11494.0	13907.0
15867.0	18594.0	20890.0	23214.0	25350.0	

In recent times, clear voice is seldom reported on these frequencies and readers that really know their HF utility listening will recognize that the majority of the frequencies in the above list are USAF allocations. The lone exception to this is 8912. That one is the property of the Federal Aviation Administration (FAA).

There are other frequencies that bear watching for Customs activities. These do not appear to be part of the ALE network. Watch for activity on:

Shared with the U.S. Air Force

3116.0	3134.0	3292.0	3369.0	4729.0	5700.0	6716.0
9014.0	9023.0	11217.0	11408.0	13204.0	13247.0	
14955.0	15048.0	15964.0	18027.0	20631.0	23217.0	
23227.0	23271.0					

Shared with the FAA

3428.0	5571.0	11288.0	13312.0	17952.0
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Other Frequencies to Watch

4500.0	12138.5	12222.0	19131.0	20348.5
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■ Just the Facts on Bluestar

A station that is commonly heard on the U.S. Navy Safety of Flight channel 8971.0 kHz is callsign Bluestar. Several reporters have indicated that the location of Bluestar is the naval station in Roosevelt Roads, Puerto Rico. One reporter also believes that Bluestar has attained the status of Navy FACSAC (Fleet Area Control and Surveillance Facility).

What does a FACSAC do? They provide scheduling, communications links, control, containment, coordination, search and rescue, and a variety of other services to all military and civilian aircraft operating in Warning Areas and off-shore Operating Areas (OPAREAS). These FACSAC use radar, processing equipment, displays, and various communications links to control platforms in their OPAREAS.

Here is a list of the known Navy FACSAC units and their HF frequencies (All frequencies use USB):

FACSAC Jax (Jacksonville) / Callsign: Sealord	3130.0	6723.0	6742.0	11252.0
FACSAC Pearl Harbor / Callsign: Hula Dancer	3379.0	6723.0		
FACSAC Pensacola / Callsign: Seabreeze	6835.0	8771.0		
FACSAC San Diego / Callsign: Beaver	6723.0			
FACSAC Vacapes (Norfolk) / Callsign: Giant Killer	2252.0	4372.0		
FACSAC Whidbey / Callsign: Down Rigger				
No known HF frequencies				

We would appreciate any new FACSAC frequencies you might have discovered recently and also information on whether Bluestar should be added to the list of Navy FACSAC activities.

Now it is time to see what you have been hearing this month in the *Utility World*.

Abbreviations used in this column

AM	Amplitude Modulation	MOI	Ministry of Information
ARQ	Synchronous transmission and automatic repetition teleprinter system	MWARA	Major World Air Route Area
ARQ-E3	Single-channel ARQ teleprinter system	NAS	Naval Air Station
ASECNA	Agence pour la Securite de la Navigation Aerienne en Afrique et a Madagascar	NAT-A	North Atlantic-A MWARA
AWS	Air Weather Service	NAT-E	North Atlantic-E MWARA
CQ	General call for any station	NCS	Net Control Station
CW	Continuous Wave (Morse code)	POL-ARQ	Polish diplomatic ARQ teleprinter system
Fax	Facsimile	RTTY	Radioteletype
GHFS	Global HF System	SESEF	Ships Electronic Systems Evaluation Facility
HF	High Frequency	SITOR-A	Simplex teleprinting over radio system, mode A
ID	Identification	Unid	Unidentified
INA	Iraqi New Agency	U.S.	United States
JRB	Joint Reserve Base	USAF	U.S. Air Force
LDOC	Long Distance Operational Control	USB	Upper Sideband
MARS	Military Affiliate Radio System	USCG	U.S. Coast Guard
MFA	Ministry of Foreign Affairs	USCGC	U.S. Coast Guard Cutter
		USMC	U.S. Marine Corps
		USN	U.S. Navy
		UTC	Coordinated Universal Time
		Volmet	Aviation weather broadcasts station

All times are in UTC, all frequencies in kHz, and all transmissions are in USB unless otherwise indicated

- 3134.0 At 0657, (within seconds of hearing them on 3295) Nightwatch 01 and War 46 are found working each other on this frequency. No designator heard, but strongly suspect Zulu 110. (Jeff Haverlah-Houston, TX)
- 3195.2 'R'-Single letter CW HF marker station in Russia at 2125. (Ary Boender-The Netherlands)
- 3270.0 KPA-Israeli Mossad numbers station in AM at 1904. (Boender-Neth)
- 3273.0 GSP Dusseldorf with an ARQ-E message to MOI Nordrhein-Westfalen (PHVNW) at 2130. (Boender-Neth)
- 3295.0 At 0656, (within seconds of hearing them on 4495.0) Nightwatch 01 and War 46 are found each other here. No designator ID heard, but strongly suspect Zulu 120. NW 01 then moved War 46 to Zulu 110. (Haverlah-TX)
- 3390.0 MGJ-Royal Navy Faslane, England, with 75 baud RTTY availability messages at 2135. (Boender-Neth)
- 3434.9 Royal Navy (England) fleet broadcasts at 2137 using 100 baud RTTY. (Boender-Neth)
- 3485.0 New York Radio with aviation weather at 0245. (Dave Kanter-IL) *Welcome to the column Dave, please check in often-Larry.*
- 3825.0 German female 5-digit Swedish Rhapsody number station at 2000. (Boender-Neth)
- 3840.0 YHF-Israeli Mossad number station in AM at 1903. (Boender-Neth)
- 3940.0 Hong Kong Telecom at 1015 with Tubular Bells interval signal and weather for the China Sea yacht race. Weather broadcasts began at 1030. (Ed Rausch-NJ)
- 4035.0 AAA5DIL-US Army MARS, District 5 net NCS at 0131, closing net. (RD Baker-Austintown, OH) AAR2JE net control for a hurricane exercise at 2128 in LSB. Closed the net at 2200. (Keith Stein-Woodbridge, VA) *Thanks, Keith, for checking in-Larry.*
- 4116.0 IAER-Unid Italian warship in tracking net at 2246. (Boender-Neth)
- 4130.0 NAS numbers station with a Mike Susan Adam broadcasts in USB at 2100. Susan Adam Robert broadcasts at 1900. (Boender-Neth)
- 4160.5 RSO working BFC requesting serial numbers reported by Hopper at 0010. (Fowler-MA) *This is a USCG/USN frequency-Larry.*
- 4165.0 SYN2-Israeli Mossad number station in AM at 1906. (Boender-Neth)
- 4270.0 PCD2-Israeli Mossad numbers station in AM at 1930. (Boender-Neth)
- 4417.0 B9Q working Group Sandy Hook in clear and green at 0035. 6516 is the USCG fisheries patrol primary in the day; this may be their night primary. (Fowler-MA)
- 4463.0 FTJ2-Israeli Mossad number station in AM at 2300. (Boender-Neth)
- 4481.0 Three note oddity numbers station (Hungarian intelligence?) in AM at 2035. Repeat of the 2005 broadcasts on 4580. (Boender-Neth)

- 4495.0 At 0655, (within seconds of hearing them on 5705.0) Nightwatch 01 and War 46 are found working each other here. No designator heard, but strongly suspect Zulu 125. Units then moved to Zulu 120 (see 3295.0). (Haverlah-TX)
- 4520.0 English female number station in AM at 0215. (Merritt Ashmore-St. Petersburg, FL) *Welcome aboard, Merritt, please check in often-Larry.*
- 4545.0 Numerous one and two letter tactical callsigns at 0245 with communications regarding target tracks and aircraft launches. At 0300, JY gave a time check and listed units in the playground. (Ed Rausch-NJ) Noted same at 2231. (Fowler-MA)
- 4580.0 Three note oddity numbers station (Hungarian intelligence?) in AM at 2005. Three note rising scale interval signal then 5-digit groups in German. (Boender-Neth)
- 4660.0 Jammer transmissions, hops to 4672 and back. Stays on each frequency between 1.5 and 7 minutes. Active all night long, every night. (Boender-Neth)
- 4672.0 Jammer transmissions, hops to 4660 and back. Stays on each frequency between 1.5 and 7 minutes. Active all night long, every night. (Boender-Neth)
- 4745.0 Nightwatch 01 working Syllabus for a signal check on self ID'ed Zulu 135 at 0254. (Haverlah-TX)
- 4880.0 ULX-Israeli Mossad number station in AM at 2100. (Boender-Neth)
- 4930.0 SPW-Warsaw Radio, Poland, sending a SITOR-A traffic list at 2102. (Boender-Neth)
- 4932.0 SPW-Warsaw Radio, Poland, sending a SITOR-A traffic list at 2107. Note that the station moved up 2 kHz from previous log. (Boender-Neth)
- 5320.0 NOQ-USCG Group Mobile, AL, at 0532 working ZIZ regarding a station in Venice, LA, having their UTB (utility) boat at Southwest Pass at 0930. (Baker-OH)
- 5385.0 Secure communications then the following in the clear at 2234, then the units switched to HF4. (Fowler-MA) *This is a USN/USMC tactical/training and exercise support frequency-Larry.*
- 5422.0 English female 5-digit Lincolnshire Poacher number station in AM at 2200. (Boender-Neth)
- 5460.0 Jammer transmissions, hops to 5472 and back. Same setup as the 4660/4672 intercepts above. (Boender-Neth)
- 5530.0 NAS numbers station with a Nancy Susan Adam broadcasts at 2100. (Boender-Neth)
- 5598.0 New York aeradio working various flights including American 56 at 0326. (Sue Wilden-Indianapolis, IN) *This is the NAT-A MWARA-Larry.*
- 5630.0 SYN2-Israeli Mossad numbers station in AM at 1859. (Boender-Neth)
- 5688.0 Unid, possible vessel at 0544, male with Spanish accent working weaker unid station on '101'. Word command used, passed lube oils report and message from the cook for items needed. Possible naval vessel...ID? (Baker-OH) *Rick, I have nothing here at all-Larry.*
- 5705.0 Browbeat working Nightwatch 01 and ID's this frequency as Zulu 145. Browbeat was immediately followed by Noontime calling NW 01, also ID'ing frequency as Zulu 145. Both Noontime and NW01 then moved to Zulu 205, not found. At 0654, Nightwatch 01 working WAR 46 and moved to Zulu 125 (see 4495.0). (Haverlah-TX)
- 5800.0 Nightwatch 01 calling WAR46 on self ID'ed Zulu 150 at 0128. (Haverlah-TX)
- 5844.0 Unid tracking net. Net control is P9Q. Others included: 4SF, 09F, B1W using English with French accents passing traffic reports at 1937. (Boender-Neth)
- 6269.0 WGZK-US flagged tanker *Chesapeake Trader* at 0630 using SITOR-A. (Baker-OH)
- 6496.4 VCS-Halifax, NS, Canada, with weather charts using fax at 0213. (Wilden-IN)
- 6604.0 New York Radio with aviation weather for east coast cities at 0215. (Kanter-IL) *This is a volmet station, Dave. They transmit aviation weather for pilots inbound to the US continuously-Larry.*
- 6628.0 Unid station mentioned CFL and flight level 270 at 2211. Possible air traffic control. (Wilden-IN) *This is the NAT-E MWARA-Larry*
- 6660.0 SYN2-Israeli Mossad numbers station in AM at 1901. (Boender-Neth)
- 6712.0 Offutt GHFS, NE, with an EAM broadcasts using preamble AYUXDX at 2052. (Boender-Neth)
- 6754.9 Trenton military (Canadian Forces) with aviation weather at 0338. (Kanter-IL) *Like the NY Radio, Dave, this is a volmet station of the Canadian military-Larry.*
- 6757.0 Goatpan working NW01 on primary Z-165 for a radio-check at 0755. (Jeff Jones-San Francisco, CA)
- 7536.5 SESEF Norfolk, Ft. Story, VA at 1524 using RTTY (850/75) with 10 minutes of foxes for the USS *Ticonderoga* (CG-47). (Baker-OH) *Another Navy channel that is using window instead of carrier-Larry.*
- 7720.0 Extremely loud jammer noted here in USB at 1608. (Boender-Neth)
- 7765.0 NLTT-USS *John Hancock* at 1044 working DoD Cape. At 1103, *Orion 4* (USN P-3C from NAS Jax) working DoD Cape. (Baker-OH)

- 7784.0 KAWN aviation weather information in various formats at 0108 using 75 baud RTTY. (Wilden-IN) *Sue, this is a USAF AWS station in Ceiba, Puerto Rico. They carry products that originate from KAWN Ft. Worth NAS/JRB, TX (the old Carswell AFB)-Larry.*
- 7831.0 Nightwatch 01 working Syllabus for a signal check on self ID'ed Zulu 170 at 0254. Then moved to Zulu 135. (Haverlah-TX)
- 7918.0 FYH-Israeli Mossad number station in AM at 1600. (Boender-Neth)
- 8143.0 MD-BND Germany in USB with 3/2-digit groups message at 1520. (Boender-Neth)
- 8207.0 VRUE8-merchant vessel *Tai Yuen* at 0242 working KMI (on 8728) for radiotelephone traffic. (Baker-OH)
- 8381.5 YLBG-TKH *Ivans Polzunovs* at 2254 in SITOR-A. Latvian reefer with crew telegrams to Riga. (Baker-OH)
- 8385.5 TCKO-Motor vessel *Omer Kaptanoglu* at 0302 in SITOR-A. Turkish vessel with telex via Berne Radio reporting passing the Straits of Gibraltar. (Baker-OH)
- 8455.0 UVA-Gelendzhik Radio, Ukraine, with CQ CW marker at 2001. (Jack Dix-Yonkers, NY)
- 8494.9 'S'-Single letter CW HF marker at 1923. (Boender-Neth)
- 8495.0 'C'-Single letter CW HF marker at 1923. (Boender-Neth)
- 8589.0 HPP-Panama Intelmar Radio, PAN at 0500 in CW with V and QSX marker. (Baker-OH)
- 9016.0 Nightwatch 01 calls and works War 46 on self ID'ed Zulu 175. At 0037, Nightwatch 01 is working a good level Noontime and NW 01 again ID'ed 9016.0 as Zulu 175, with their secondary as Zulu 190 (Haverlah-TX)
- 9057.0 Nightwatch 01 works Tinhorn on self ID'ed Zulu 180 at 1339. They moved here from 9016.0 to get away from the strong Andrews/SAM 206 interference on 9017.0. They then moved to Zulu 190 (10204.0) and Tinhorn entered the net, with Tinhorn immediately going monitor only for 1.5 hours. Secondary frequency said to be Zulu 210. (Haverlah-TX)
- 9160.0 Numbers station at 0700 with 10-count and message for 257. (Boender-Neth)
- 9809.0 Based on some last minute monitoring prior to presstime, this frequency is believed to be Zulu 185 (tentative). (Haverlah-TX)
- 10057.0 ASECNA Brazzaville volmet, Congo, with French aviation weather at 1713. (Robert Hall-Capetown, South Africa)
- 10075.0 Houston (Universal Radio) at 2216 working Connie 809 with phone patch to Connie Ops. At 2217 New York ARINC working DHL 530 with phone patch to company. At 2255 Cedar Rapids LDOC, IA, working United 942. (Baker-OH)
- 10204.0 Landfall calling any station this net on Zulu 190 (no joy) and gone. (Jones-CA)
- 10387.9 Polish embassy Rome, Italy, with Polish traffic for MFA Warsaw using POL-ARQ at 1730. Unable to decode. (Hall-RSA)
- 10454.0 VOA broadcast feeder in LSB at 2108. (Fowler-MA)
- 10524.0 HMF45-KCNA Pyongyang, North Korea, with French RTTY (510/50) news bulletins at 1148. (Dix-NY)
- 11052.0 Paccom 01 working Andrews on F-561 with signal checks at 1845. (Jones-CA)
- 11053.5 Andrews working unid SAM flight at 1805. (Jones-CA)
- 11153.6 Golf or could have been Gulf calling any station this net for a radio check at 1905 (no joy). (Jones-CA) *I have only seen Mystic Star activity reported around here Jeff. Interesting intercept-Larry.*
- 11118.0 SAM 201 here asking Incirlik for another discrete frequency. They switched to 7961.0. Late the same evening heard them also use 11445. (Gerbrand Diebels SC-MAC-Helmod, Netherlands)
- 11170.0 NAS numbers station with a Mike Susan Adam broadcasts at 1230. (Boender-Neth)
- 11175.0 Neon Sign working Nightwatch 01 via McClellan GHFS patch at 2015 After a lengthy series of authentications, Neon Sign entered the net and received a series of EAMs from Nightwatch 01. NW01 also advised Neon Sign that "station Sizeable is also in the net, working Zulu 185". NW01 instructed Neon Sign to try "Zulu 215"; Neon Sign replied "I thought Zulu 211 was primary, are you now working Zulu 215?". NW01 responded in the affirmative, and the patch was terminated. (Bob Lewallyn-Houston, TX) SAM 60201 working Incirlik GHFS requesting a discrete frequency, passed 102 (no F), but SAM said he didn't have a list of Incirlik frequencies. Passed 11118.0 in the clear. This demonstrates that GHFS stations are using Mystic Star frequencies for their own discrete use. (Diebels-Neth)
- 11181.0 Heard NW 01 calling Deadman on Zulu 200 self ID'ed requesting him to acknowledge current traffic. Heard a new EAM passed a few minutes earlier. When he didn't get a reply, he passed same EAM here on Zulu 200. (L. Van Horn-NC)
- 11212.4 I9S calling Habitat several times at 0031. (Fowler-MA) *This is a USN Pacific ASW net. Anyone know for sure what command Habitat is? I9S dialed in their mode offset (window) frequency instead of their carrier (11211)-Larry.* Habitat (NAS Whidbey Island) working Magic Carpet and Foxtrot 1 with alligator traffic at 0100. Also heard on 9011.4 and 6719.4. (Jones-CA) *More of frequency stuff-Larry*
- 11217.0 Reach 0030 working Dixie Control with their inbound status at 2259. These were direct comms and not a phone patch. (Fowler-MA)
- 11229.0 WAR46 working NW1 for radio check on Z-210 at 0130. (Jones-CA)
- 11270.0 Russian male number station at 0820 with message for 615: 81563, 84903, 00000. On the next day, same time another message for 615: 07918, 03458, and 00000. (Boender-Neth)
- 11494.0 At 1800, Opalring is working Roughgem on 11494.0 in voice and data after getting permission from Nightwatch 01 to move off the primary frequency, and ID'ing the frequency as Zulu 205. This frequency is definitely "out of sequence". (Haverlah-TX)
- 11545.0 English female 5-digit Lincolnshire Poacher number station at 1908. (Boender-Neth)
- 12482.5 PESF-TR *Holland Clipper* at 1946 in SITOR-A with telex for Port of Daytona, Port Canaveral. (Baker-OH)
- 12490.5 9VHL-Singapore-flagged car carrier *Medea* at 0037 in SITOR-A. (Baker-OH)
- 12496.5 BOPU-Chinese-flagged motor vessel *Qu Yuan* at 1516 in SITOR-A. (Baker-OH)
- 12512.5 UTJK-TKH *Katya Zelenko* at 2238 in SITOR-A. (Baker-OH)
- 12523.0 YLBY-Latvian refrigerated fish carrier *TR Akademikis Artobolevskis* at 1515 in SITOR-A with telex to Riga Chart via Riga Radio. (Baker-OH)
- 12566.5 UNMJ-Russian long range/endurance large autonomous trawler/freezer vessel *BATM Dzhaparidze* at 2111 using 170/50 RTTY. (Baker-OH)
- 15567.0 UFXL-Russian refrigerated fish carrier *TR Novorossiyskiy Rabochin* at 2059 using 170/50 RTTY to UGW-Novorossiyskiy Radio. (Baker-OH)
- 12571.5 LYBA-Lithuanian stern ramped medium fishing trawler/freezer vessel *SRTMK Seduva* at 2120 using 170/50 RTTY. (Baker-OH)
- 12576.5 C4TW-flagged out or Russian crewed reefer *TR Frio Argentina* at 2140 sending 170/50 RTTY crew telegrams. (Baker-OH)
- 12603.0 English female 5-digit Lincolnshire Poacher number station at 1900 with parallel broadcasts on 7337 and 9251 kHz. (Boender-Neth)
- 12646.0 LPD-General Pachecho Radio, Argentina, at 0425 with SITOR-A free signal and CW ID. (Baker-OH)
- 12674.0 HMZ-Pyongyang Radio, North Korea, with CQ CW marker at 1203. (Dix-NY)
- 12677.0 HMZ-Pyongyang Radio, North Korea, with CQ CW marker at 1348. (Dix-NY)
- 12710.0 XSZ-Dalian Radio, China, with CW CQ marker at 1208. (Dix-NY)
- 12906.00 DZJ-Bulacan Radio, Philippines, with a CQ CW marker at 1046. (Dix-NY)
- 12912.5 FFL6-St. Lys Radio, France, with CW weather from Metro France at 1233. (Hall-RSA)
- 12932.9 UFZ-Vladivostok Radio, Russia, with crypto RTTY traffic (835R/96), not cyrillic at 1237. (Hall-RSA)
- 12950.0 SYN2-Israeli Mossad number station in AM at 1324. (Dix-NY)
- 13242.0 Nightwatch 01 noted here on self ID'ed Z215 at 1559. (Jones-CA)
- 13245.0 Caught Narration calling Nightwatch 01 on this frequency and self ID'ed as Zulu 220 at 0011. No answer from NW01. (L. Van Horn-NC)
- 13282.0 Honolulu Volmet, HI, at 0438 with aviation weather. (Baker-OH)
- 13330.0 New York ARINC at 0047 working Continental 4 with selcal check CM-BE (DC-10 N87070). (Baker-OH)
- 13354.0 San Francisco ARINC, CA, at 0133 working Air France 071. (Baker-OH)
- 13375.0 English female 5-digit Lincolnshire Poacher number station at 1500 with parallel broadcasts on 11545 and 15682 kHz. (Boender-Neth)
- 14441.5 US Navy MARS NNNOCVP-USS *Conoley* (DD-979) at 0156 calling for any stateside station, then routine phone patch traffic. NNNONZU-Unid airborne unit also on the 14 MHz calling frequency. At 0255, NNNOCQD USCGC *Jarvis* (WHEC-725) calling with traffic. (Baker-OH)
- 14699.2 YIX70-INA Baghdad, Iraq, with RTTY (406R/50) press bulletins at 1610. (Hall-RSA)
- 14890.0 Russian male number station at 0800 with message for 615: 89513 82403. On the next day, same time another message for 615: 08188 82403. (Boender-Neth)
- 15964.0 Portishead LDOC working unid flight at 1716. (Baker-OH)
- 16080.0 Bookshelf working Cookhouse with tactical training type comm at 2030. Other players mentioned: Draiper 41, Okie 13, Grizzly, Castro 43 and others. (Jones-CA)
- 16084.0 English female 5-digit Lincolnshire Poacher number station at 1000, 1100, 1200 and 1300 with parallel broadcasts on 14487 and 15682 kHz. (Boender-Neth)
- 16262.0 French Forces Paris, France, with code de voie using ARQ-E3 (390/192) at 1313. (Hall-RSA)
- 16716.5 UICJ-Russian tanker *TK Pobeda* at 2024 in SITOR-A with service message to Novorossiysk Radio. (Baker-OH)
- 16920.0 9GX-Tema Radio, Ghana, with DE CW marker at 1415. (Dix-NY) *Nice catch, Jack, I haven't seen this one reported in the States before-Larry.*
- 16929.8 9HR-Malaysia naval radio, Johore Bahru, with RTTY (853R/50) 5-letter groups at 1234. (Hall-RSA)
- 16987.0 VRX81-Cape D'Aguilar Radio, Hong Kong, with CQ CW marker at 1257. (Dix-NY)
- 17037.0 YQI-Constanta Radio, Romania, with hand sent CQ CW marker at 1259. (Dix-NY)
- 17239.7 PKX-Jakarta Radio, Indonesia, with CQ CW marker at 1308. (Dix-NY)
- 18027.0 Surprise working Classical for signal checks at 1657. (Jones-CA)

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ALGERIA RTA English not heard at 2000, just at 1800-1900 on 15204.95 only (Brian Alexander, PA, *World of Radio*)

ANGOLA VORGAN heard well on 7090 at *0449-0630+ (Brian Alexander, PA, *World of Radio*) V. of Resistance of the Black Cockerel announced sked: 0450-0900 and 1650-2100 on 7090, 1050-1430 on new 9775 (BBCM)

BOLIVIA Great mortality of community radio stations expected for those who did not convince government of legality (Jorge Mato Esquivel, RN *Radio-Enlace*) Rdif. Minería, Oruro on new 5927.2 ex-4985.4 from *1045v (Emilio Pedro Povrzenic, Argentina, *Latinoamérica DX* via *Radio Nuevo Mundo*)

BULGARIA Bulgarian heard at 0320-0400* on 9052.44 (Brian Alexander, PA, *World of Radio*) Seems to be Plovdiv 9700 minus MW 648 (Wolfgang Büschel, BC-DX)

CANADA CBC's *Now the Details* on summer break till mid-Sept, replaced by half-hour version of new *Global Villages* on musical cultures. (So also on RCI Sun 2231, Mon 0230.-gh) Also on RCI Sun 2231, Mon 0230, *Connections*, best of public radio from around the world, Mon 2329 on 5960, 9755, 13670. At 0205-0300 UT RCI carries CBC summer lineup: Tue, *Quirks & Quarks*; Wed, *Sunday Morning on Tuesday Night*, etc. (CBC *Radio Guide* via Tim Flannery). RCI is broadcasting live from Ottawa two days a month, for increased public exposure, such as July 20-21 (VOA *Communications World*)

CENTRAL AFRICAN REPUBLIC National Radio destroyed in clashes between mutineers and French armed forces, RFI reported. 5034 and 7220 subsequently silent (BBC Monitoring) Undestroyed. 5033.9 heard again mid-June at 1815 (Finn Krone, Denmark, *DX Window* via *The Latest Catch*)

COSTA RICA Once 10 kW transmitter completed, 15050 daytime will convert from USB to AM (RFPI *Mailbag*) *Report from the Desert*, Wed 1840, Thu 0240, 0940, now offers special QSL for reports with return postage to RFPI (Richard F. McCarthy, AL)

CUBA RHC to Europe at 2100 supposed to be in English on 13715, Spanish on 13680, but on one occasion 13715 also in Spanish (Roger Tidy, London) 13715 is 100 kW, 13dB gain rhombic, 10 degree departure angle, azimuth 41 degrees; also on SSB 13725 20 kW PEP, similar rhombic slightly more northward; at 0500-0700 9830 SSB is 30 kW PEP on same antenna as 13715 but less gain here. RHC also recently added audio processing, almost 4:1 compression (Arnie Coro, RHC, *Electronic DX Press*)

CYPRUS BBC relay 0000-0200 to SAs on 9410 is from here, then from 0200 UK site (Randy Stewart, MO) Unusual for a relay to use out-of-band channel

DENMARK [non] R. ABC/Denmark, successful commercial station since 1990, has hired time on 120 kW Kaliningrad SW clear channel 7570 Suns 0800-1200; English program includes *Danish Top 30* at 1000-1100, *DX Report* at 1130, since June 23; should be heard well in all of Europe, possibly beyond. Report to P.O. Box 174, DK-8900 Randers, Denmark; info at <http://www.radioabc.dk> (Stig Hartvig Nielsen, Radio ABC)

[non] R. Denmark Int'l via Norway, English at :38 past every hour on 1st and 3rd Suns/UT Mons made some changes: 1638 WNA 13800 ex-11840; 0438 7520 ex-7465 (Erie Koie, RDI, *DX Window*)

DOMINICAN REPUBLIC New on 5012.3 was R. Pueblo, Santo Domingo, but shortly changed name to R. Cristal Internacional (Michael Schnitzer, Germany, DSWCI *DX Window* via Thurman) Home made 1 kW, half-wave horizontal. Ap. Postal 894, fax 809

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; Z-96 = Summer season*

567-9107 (via Ullis Fleming, *Cumbre DX* via BC-DX via Thurman) Sked 2100-0300, plans DX program (Fleming, *CDX* via *DXPL*)

ECUADOR HCJB made sudden switch from 5900 to 9445 to SPac at 0700-1130 (Chris Hambley, W.O.R.) To avoid PNG medical net on 5895 (Rich McVicar, *The Latest Catch*) Much better here—no Martí splash (gh, OK) Clayton & Helen Howard are now at a retirement home in Tahlequah, OK, involved in closed-circuit TV (*DX Partyline*)

GABON Rainy season lasted longer than normal causing flooding especially in southeast where Africa Number One is; and may continue through usual dry season into August. An ANO transmitter was severely damaged, disrupting these broadcasts: 0300-0500 9580, 0600-0700 & 0800-1000 17630, 1500-1800 15475. Would fix ASAP (BBCM)

GREECE USIA signed agreement with Greek Ambassador in Washington to renew VOA relays in Kavala, Rhodes; goes to parliament for ratification (USIA via BBCM)

V. of Greece airs *Zontani Gramme* daily at 2000-2150 on 7450, 9375—live phone-in from Greeks worldwide and ships at sea. To NAm 1200-1350 on 15630 ex-15650 due to Israel; English news 1335. Macedonian station: 0500-0800 7430, 0500-2155 11595, 0500-2205 9935, 1700-2205 7430 (John Babbis, MD) VOG has additional weekly English segments: Fri 0115-0130 7448, 9420, 9935; Sun 0315-0330 on same; Sun 0730-0745 7450, 9425, 11645; Sat 2145-2200 9425 (Gayle Van Horn via Thurman) These are Greek lessons in English (Babbis)

GUATEMALA URNG has included negotiations for a [legal] radio frequency for La Voz Popular in the peace process, prime means of communication to illiterate audience (*Prensa Libre* via BBCM)

GUYANA GBC reactivated SW in late May, heard at 0220 and 0900 on 3290 (Ed Rausch, NJ, W.O.R.) 0900-2100 5950, 2100-0900 3290; overnight "filler" from 0300 is *Nightrider* (Jerry Berg, *Cumbre DX* via *EDXP*)

HONDURAS R. Copán wasn't happy with tests on 7460, expected to return to 15675 (Jeff White, WRMI via Hans Johnson, *Cumbre DX* via *DX Window*)



RADIO COPAN INTERNACIONAL

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HONG KONG RTHK yacht weather special on 3940 in April was not from old 2 kW transmitter, but 10 kW Cape D' Aguilar station, per full-data card (Takayuki Inoue, *Cumbre DX* via *DX Ontario*)

HUNGARY Visited R. Budapest; Charles Coutts, head of English section, read *MT* cover to cover, but dismayed station not mentioned despite early skeds sent to Hauser. Also said paying transmission company for "full power" but not getting it (Gigi Lytle, Hungary via Frimmel) We never get their program info early enough to be timely, and freq skeds were FUBAR (gh)

ITU HFCC lists Hungarian Radio domestic relays on SW for Z96: 100 kW 6025 at 0320-2310; 20 kW: 0500-0600 7155, 1630-1700 7250, 1700-1730 7220, 1930-2000 7125 (Bob Padula, *EDXP*) 6025 previously reported closed down (gh) None listed by BBCM or *WRTH* (Padula, *ARDXC NewsPlus*) Confirmed on 7155 at 0540, rarely audible (Padula, *ARDXC OzTrail*—all via Thurman)

ICELAND [non] Alpha & Omega leased DW Jülich 6110 Sun 1900-2000 English (Paul Brems, Belgium via RKI *SW Feedback*)

INTERNATIONAL WATERS Allan Weiner has teamed up again with Scott Becker for another try at offshore radio, but this release gives no hint as to where it's being built or where it will sail (gh) Lightwave Mission Broadcasting and Becker Broadcast Systems

are outfitting a ship for international SW and MW, to be named *Electra* in honor of Marconi's experimental radio ship, on by summer's end. Will promote environmental issues, lease time (Anita McCormick, Internet via Dan Henderson, DSWCI DX Window)

R. Liberação [*sic*—should be Libertação] is pirate from a boat off Rio Grande do Sul, Brazil, on 1710, 12040, 21865 0900-0300 in Portuguese, Spanish, English (rec.radio.sw via Mick Ogrizek, ARDXC NewsPlus via Thurman) Doubtful item, but...?

IRAN [non] Alarm about Tehran's [broadcast] capabilities led Sen. D'Amato to introduce legislation last year to establish R. Free Iran. Bill now being reworked (Robin Wright, L.A. Times via Tom Risher)

IRAQ It was misleading for you to list an Iraqi station in June under Saudi Arabia, since it was anti-Saudi (Dave Kaiser, HZ1AB, ARAMCO, Dhahran) You misunderstood; it was headed "[non]" which means not from but clandestine about or for Saudi Arabia (gh)

ITALY Rock-It Radio, via IRRS, 3950 heard at 2000 on a Sunday, QSLed for E-mail. Studios at Ventura, California, trying IRRS and may add other SW outlets. Focuses on good sounding songs, rockabilly and doo-wop which had regional or minor success, original rock of fun, life and music rather than negative themes today (Francis Mougenez, France, DSWCI DX Window via Thurman) See also USA—WRMI (gh) Moved to 3955 (Bob Padula, ARDXC NewsPlus)

R. Italia Int'l, Spoleto sold its SW to R. Maria, heard on 7140 at 0900-1530, 15 kW 24 hours. Address: R. Maria, via Turati 7, I-22036 Erba, Italy (Play DX via EDXP)

IVORY COAST RTVI back on SW, 7215 at 2100-2400*, classical music first hour, then African (Eugene Gebreurs, Antwerp, RVI Radio World via Steven Cline) Strong but undermodulated, also 0600 after TWR South Africa goes off; no sign of 6015 or 4940 (Bob Hill, MA, Cumbre DX via EDXP)

JAPAN R. Japan new program is *Town & Around* featuring different towns on a chosen theme each month—Wed 1521, 1721, 1921, 2121, 2321 (R. Japan via World DX Club Contact)

KOREAS All three frequencies of KBS' Liberty home service to N Korea are jammed at 1715, each with a different style—6135 warble, 3930 pulse, 6015 buzzsaw: different sites? (John Fisher, Korea, Cumbre DX via BC-DX)

KURDISTAN [non?] V. of the Iraqi Communist Workers' Party (Arabic: *Sawt al-Shuyu'i al-Ummali al-Iraqi*) first observed May 20, maybe replacing silent V. of the Iraqi People, saying it broadcasts for "citizens of Sulaymaniyah" (in Iraqi Kurdistan), 1530-1630 Kurdish, 1630-1730 Arabic on 4000, also announces 0300-0500 on 4000 (BBCM)

KUWAIT An Iranian official visited Kuwait, said America's use of VOA relay here against Iran was "intolerable." Now MW 600 kW but 1992 agreement calls for 10 SW transmitters (BBCM)

LEBANON Several V. of Hope staff had very close calls when rockets landed on their paths moments before or after they passed impact points (Gary Hull, VOH via Hans Johnson, Cumbre DX via DX Window) What do they expect, setting up a station in a war zone? But then the Adventure would not have been so High (gh)

High Adventure Ministries

VOICE OF HOPE INTERNATIONAL RADIO NETWORK

LIBERIA ELWA transmitters first reported to have escaped damage, then to have been destroyed again in civil war; may rebuild hospital, not radio (SIM International via HCJB TLC)

LITHUANIA R. Vilnius added new morning repeat of previous night's English program, 0830-0900 on 9710, on trial basis (BBCM) 9710 is 50 kW, 259 degrees from Sitkunai (Sigitas Zilionis, DSWCI DX Window via Thurman)

MALTA [non] V. of the Mediterranean tested in June at 1900-2100 on 9765, 12060, preceded and followed by V. of Russia on its transmitters, with English 1900-1921, 1958-2020; other times, French, German, Arabic (Eugene Gebreurs, RVI Radio World via Cline) Also Sun 0100-

0400 15480 to Australia where lots of Maltese live (Bob Padula, EDXP) Russia confirmed by station, maybe St. Petersburg; most likely to continue: 12060 (Hans Johnson, Cumbre DX via EDXP) Both 9765, 12060 inaudible here (gh)

MEXICO XERMX planned to retime programs in July; already in June, *Encuentro DX* moved from 1800 to 1900 Sat on 9705 (W.O.R.)

MOLDOVA Mail to both stations is unreliable, so Rumen Pankov offers to act as QSL bureau for R. Moldova International and R. Dnestr International, both asking for 4 IRCs or USS1 and 1 IRC, via Rumen: P O Box 199, 1000 Sofia-C, Bulgaria (Bob Padula, EDXP)

NEPAL R. Nepal at 0015-0300 made seasonal change from 3229.8 to 7165 about May 13 (Victor Goonetilleke, Sri Lanka, DX Window)

NETHERLANDS RN documentary, Wed & Fri: Aug 14-30, *Wake of the Half Moon* on New Netherland colony 1609-1664 (*On Target* via Maurer, Thomas, Cline, Moats)

NICARAGUA R. Zinica [formerly on 6121] had its MW 830 transmitter destroyed by men with machetes who also cut cables; 10 kW unit would cost \$40K to replace. Director Arturo Valdez called it criminal sabotage in the electoral campaign; this FSLN outlet still on FM (*Barricada* via BBCM; Nicaragua Network Hotline via Peacenet via Patrick Crumhorn)

NIGERIA [non] R. Democrat International Nigeria heard at 1515 on 15120, band music and test announcements, schedule 1500 on 15120, 0600 on 11900; came in quite well (Dave Jeffery, NY, W.O.R.) New clandestine obviously using RSA transmitters (gh) Planned to adjust time of afternoon airing (Jerry Berg, NU via HCJB TLC) e-mail contact in England is nalicon@postlin.demon.co.uk, unverified address PO Box 9663, London SE1 3LZ, England. Programming is in English and thus unusually interesting for a clandestine (George Zeller, OH) After July 1st, planned to broadcast 2100-2200 only on 7195 (Roger Tidy, UK)

PERU R. América, 6010.7, testing mornings only with channel 4 TV news relay, heard at 1145-1218 (Pedro F. Arrunátegui, Lima, DSWCI DX Window via Thurman) R. Los Andes, 6479.8, uses fuel-generated power, goes off for 30-45 mins around 0000 to refuel (as does R. Altura, 7143). Mighty signal at night. Has really pompous canned ID harangues, giving elevation, coordinates, area (Henrik Klemetz, *Dateline Bogotá*)

POLAND Polish Radio's new flagship show is *Europe East* with correspondents from Estonia to Moldova on politics, business, lifestyles, Sat 1210. This and other programs offer lots of monthly prizes—T-shirts, CDs, videos; winners announced on first *Postbag* of each month, Sun 1230 on 11815 (PR via WDXC Contact) Among other times, but this the best chance in NAM.

PORTUGAL Glória site for IBB services [VOA, RFE/RL] closed down at May-end, transferred to other IBB relays (Dan Ferguson, IBB, ARDXC NewsPlus via Thurman)

R. Portugal moved English to us one hour later, 0330-0400 Tu-Sa on 9570, 6095, remedying clash with Vatican (Ben McKinney, Ont., *DXing with Cumbre* via Diane Maurer) When we checked, nothing on 6095 (gh)

RUSSIA R. Stantsiya Medetsina dlya Vas is new—Medicine for You, 11630 at 0300-1300, seems 100 kW Noginsk site near Moscow (Nikolai Rudnev, WWDXC via NU via HCJB TLC)

SAIPAN KFBS tries to reach Europe, since it has added Polish on Day

DX Listening Digest

More broadcasting information by country compiled by Glenn Hauser

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3 [Wed?] at 1915-1930, Romanian Day 2 1830-1900; German is for Kazakhstan [which is partly in Europe] 1545-1600 Days 1, 3, 4; 1830-1900 Day 1, 1845-1900 Day 7; other times in the 1130-1930 period in Russian or Ukrainian, all on 9465. In the "World by 2000" drive to reach as many ethnic groups as possible, KFBS also broadcasts in such exotic minority languages as Banjar, Bugis, Jarai, Koho, Makasar, Rosetin, Sundanese (via FEBC www page via Christoph Ratzer, *BC-DX* via *EDXP*; updated by Nikolay Pashkevich, Russia, *BC-DX* both via Thurman)

SÃO TOMÉ VOA relay activated 3rd transmitter: 5970 0430-0700, 11765 1630-1830, 12080 1830-2130 (VOA CW)

SOUTH AFRICA Foreign Affairs Ministry deleted funding for Channel Africa. It might have to close shortly unless SABC can come up with another way to pay for it (*Mail & Guardian* via BBCM) Maybe coincidental, but: (gh) Head of Channel Africa, Lebona Mosea was dismissed in early May after being found guilty of misusing a company credit card on a visit to Amsterdam (SAPA via BBCM) After two-week nightmare, cabinet decided to keep Channel Africa, but under SABC; saved only thanks to international support! (Flame Nieuwenhausen, Ch Af Exec Ed, RNMN; AFP via Alpert) 17 SW transmitters also relay many other stations, a factor in reprieve so Channel Africa would not lose out to them (VOA CW) Needs \$30 million for 3 years (Marie Lamb, *DXing with Cumbre*)



SRI LANKA In Late May, strike against electric company completely cut off power here, putting TWR off air, but fate of SW stations SLBC, R. Japan, DW unknown. Local time changed to UTC+6:30 from May 25, per press reports, no doubt due to power shortages (David M. Clark, *Cumbre DX* via *BC-DX*) More like Burmese nonsense instead of India. Trincomalee previously reported to be diesel-powered (gh) R. Japan quickly leased more time in Britain (Wolfgang Büschel, *BC-DX*)

SWEDEN R. Sweden 0230 on 6090 ex-7290, but then heard on both; at 1330, 13740 ex-11650 //15240 (Larry Shewchuk, Man.)

TIBET [non] V. of Tibet began in mid-May, from Oslo, transmitted via FEBA Seychelles, 15445 M-F 1145-1200; initiated by Worldview International, which also started Democratic V. of Burma. It's the voice of a voiceless people (VOA Communications World) Fax: +47-2211-4988; address: Worldview International, Welhavensgt. 1, 0166 Oslo 1, Norway (BBCM) Occupies former DVOB offices which has moved. Focuses on Tibetan culture, education, human rights, news, in three dialects; not Dalai Lama mouthpiece, but with journalistic freedom. Budget \$300K, hopes to expand time in near future (Bernt Erfjord, *DX News*, Norway via *DX Window*) VOT agreed not to counter FEBA's Christian standards (HCJB DXPL)

UKOGBANI BBC World Service is losing power to create its own programming, in BBC reorganization. Must 'buy' shows from other BBC units or contract with companies; I sense this will reduce BBC WS to a transmission organization (Chris Hansen, rec.radio.shortwave via Thurman) Shocking this might even happen with news, but many features already handled thusly (gh) Several hundred BBC employees demonstrated against downsizing the WS (UPI via David Alpert) Radio as a medium with its own identity appears to have been swallowed up as just part of the larger territory for digital TV and new media via Internet (RNMN via Diane Mauer) BBC test of ID Logic reported last month on 13680 was from Skelton site (BBCM)

UKRAINE Ukrainian Radio First Program *0300-2300* but exact span not established, on 7245, 6105, news and info partly in Russian (BBCM)

URUGUAY Emisora Ciudad de Montevideo, first heard mid-May with tests on 9650.0 varying to 9650.2, *1500 varies to *1600, heard as late as 2300 fade (Tony Jones, Paraguay, *NU* via DSWCI *DX Window* via Thurman) halfwave dipole, 1.5 kW, tho authorized 10 kW (Horacio Nigro, *NU* via HCJB *TLC*) Dec 95 IBRA sked has this strange entry under Uruguay: 6370 M-F 1930-2000, Wed 1900-1930, Sat 0805-0900, daily 2200-2430 (Jerry Berg, *ibid.*)

USA WORLD OF RADIO via WWCR: 15685; Thu 2030, Fri 2115,

Mon 2030, Tue 1230, Wed 1130, 12160; Sun 1730, 9475; Fri 2215, Sat 1600, Sun 2130, 7435; Sun 0100 & 0800, 5065; Sun 0900, 3215; Mon 0430. Due to Alaskan fish & wildlife net, WWCR curtailed 3215, went back to 7435 at 0500-1000; affects *World of Radio* Sun 0800, *Spectrum* Mon 0800, *Ham Radio & More* Mon 0900 (gh) NAm 60mb station hrd for first time via long-path! WWCR 5065 at 2325, possibly because there weren't any in the past (Bob Padula, ARDXC *OzTrail* via Thurman) Pam Beesley, popular "patriot" talk host for American Freedom Network, was fired after her boss in South Dakota was accused of being an FBI informant. After death threats, they both went underground (Valerie Richardson, *Washington Times* via Chet Copeland) Was on WWCR at noon weekdays. WWCR opened website, simply: www.wwcr.com (gh) See also Hauser's Highlights.

KVOH plans to go on 5085 by August (Hans Johnson, *Cumbre DX*) 5085 had been on George Jacobs & Associates master schedule, but revised in late May lacking it but with 9975 also to be available mornings 1400-1600 (via George Thurman) 9975 heard with Farsi UT Mon 0100-0130 from Christian Joy Center, Tustin CA; wonder how many listen in Iran? (Hans Johnson, *Cumbre DX* via *BC-DX*)

Future of WINB is grim: still no plans to repair 50 kW SW that broke down in April 1995 (Hans Johnson, *Cumbre DX* via *EDXP*) AM & FM stations at least, off for 12 months will lose their licenses, per new Telecomms Law (*Radio World*)

WRMI, 9955, following visit to Jerusalem by Jeff White, relays Kol Israel news in Spanish, recorded at 1950, played at 0215 except UT Mon. Also carries anti-Semitic *Herald of Truth* dumped by WWCR, Tue-Sat 0000. *Rock-It Radio* [see ITALY] was to begin July 7, Suns 1900-2000. *La Onda Mundial* no longer on sked, but another DX program is *Con Frecuencia* UT Sat 0230-0300 (WRMI June sked via George Thurman) *The Space Scene* with Bill Nelson is new on WRMI, third Sats 2030—space news and shuttle mission previews (Nelson, W.O.R.) WRMI's highest priority is getting application completed and approved for new antenna to Canada and Mexico (White via Johnson, *Cumbre DX* via *DX Window*)

WGTG, 9400 heard Sun 2100-2200 with Baker Brigade program against the "Vampire New World Order", describing Sen. Robert Byrd as a mind-control agent, Loretta Lynn and Barbara Mandrell his "mind slaves" (Timothy B. Gunter, AR)

VOA had scheduled programs of the late Willis Conover, and perhaps is still running his tapes, regionally and not on all listed English frequencies: *Musica USA-Jazz*, Mon-Sat 2010, Sat 1410; *Musica USA-Standards*, Sun 1930, Mon 1130, 1530, 1930, 2200, 2430, Sat 1130 (VOA Guide) Conover's jazz show will become weekly retrospective. VOA Dixon site purchased by Globe Wireless, converted to non-voice maritime comms (VOA CW)



For a report on charges of corruption and influence peddling at Radio Marti, see *US News & World Report*, June 3, p. 36 (gh)

UZBEKISTAN R. Vatandosh, *0230-0330* on 9530, 9545, 7190, 9715, in Uzbek with ID, sked, music, news, talk (Valery Ostroverkh, Kazakhstan, DSWCI *DX Window*)

VIETNAM VOV adjusted 15008.2, now on exactly 15010.0 with English at 1600 (Thomas Mueller, Germany, DSWCI *DX Window* via Thurman)

ZAMBIA Christian Voice on new 3330 under CHU at *0358 with ID, takeoff on *Jeffersons* theme, not easy but best on LSB as CHU is on USB; fade by 0410 (Randy Stewart, MO) Peaks 0420, fade 0440 (Larry Shewchuk, Man.) Schedule 0400-0700 3330, 0700-1600 6065, 1600-2200 3330 (Andrew Flynn, RCV via Zacharias Liangas, *BC-DX*)

ZNBC much stronger than before on 4910; must be new 100 kW transmitter. Also heard daytime on 7220 (BBCM) 4909.6 was hardly audible, now armchair quality evenings (Finn Krone, Denmark, *DX Window*)

Until the Next, Best of DX and 73 de Glenn!

Broadcast Loggings

Gayle Van Horn



0001 UTC on 9770

USA: Voice of America. Story on pirate radio broadcaster creating havoc with Spain's ATC system. (Sue Wilden, Columbus, IN) *VOA transmitter site via Philippines*. -ed.

0014 UTC on 3289.91

NAMIBIA: NBC. (tent.) Continuous fine lite music, pop songs and afro pops, no announcer comments heard. Interferences noted to 0028. (Giovanni Serra, Rome, Italy)

0150 UTC on 6235.3

DOMINICAN REP.: Radio Quisqueya. Spanish. Lively salsa music. Re-check at 0210 with 50's remake of tune *Little Bitty Pretty One* by Huey Lewis & the News. Station ID to music from the Beatles', Elton John and the Beach Boys. (GVH-NC)

0235 UTC on 3324.8

GUATEMALA: Radio Maya de Barillas (TGBA). Spanish. Haunting flutes playing *Amazing Grace*. Male announcer's ID and station promotional. Religious vocals and scripture readings. (GVH, NC)

0313 UTC on 7345

VATICAN STATE: Vatican Radio. Story on Galileo and Kepler, followed by *Saints Alive* program. (Wilden, IN) Station monitored in French on 11625 at 0559. English at 0630 on 11625//15570, 13765. (Serra, Italy)

0345 UTC on 7269.9

ALBANIA: Radio Tirana. Albanian. Ethnic music and comments by female host. News at 0350 to 0400 ID. (Jerry Witham, Keauau, HI)

0420 UTC on 3330

ZAMBIA: Radio Christian Voice. English religious program to hymns and ID. Station heard under CHU time/frequency station with signal peaks 0415-0420. (Larry Shewchuk, Seven Sisters Falls, Manitoba, Canada via e-mail)

0420 UTC on 6045

BURKINA FASO: Ethnic language. Female announcer having a lot of fun airing announcements and spinning regional music! "Radio Burkina Faso" ID at 0430. Wiped out by Germany's Deutsche Welle at 0500. (Witham, HI)

0425 UTC on 4800

LESOTHO: Radio Lesotho. Sesotho. In progress with call-in phone calls past 0430. News in English at 0500. (Witham, HI)

0655 UTC on 5020

SOLOMON ISLANDS: SIBC. English/Pidgin. Musical standards with a mix of public service and commercial announcements. ID and news at 0700-0713. (Witham, HI)

0720 UTC on 3945

VANUATU: Radio Vanuatu. French dialogue to conch shell interval signal and ID at 0726. New-age music to ads for FAB (detergent?) and Fig Newtons. IS repeated at 0732 followed by newscast. (Witham, HI)

0740 UTC on 5950

USA: Voice of Free China relay via WYFR. Program segment on the history and evolution of Taiwan's tea houses. (John Hanz, Old Bridge, NJ)

0802 UTC on 17895.14

PAKISTAN: Radio Pakistan. *Pakistan Calling* program including news 0800-0804. Station ID, announcements and music pauses. Holy Koran recitations with English translations 0806-0811 to ID/frequency quote, // 15470.05. (Serra, Italy)

0904 UTC on 9606.4

INDONESIA: (Java) RRI-Serni. Indonesian. Prayers and recitations to regional music with female vocalists. (Witham, HI)

0910 UTC on 5900

ECUADOR: HCJB. DX Partyline show celebrating their 35th anniversary. (Hanz, NJ)

0945 UTC on 6100

NEW ZEALAND: Radio NZ Int'l. Easy-listening music program. (Bob Fraser, Cohasset, MA) Station noted on 15115 at 2220 with good signal. (Vern Breitkopf, North Vancouver BC, Canada)

1241 UTC on 11890

OMAN: Radio Sultanate of Oman. Arabic. Male talk to pop music. Brief announcements with chat alternating between pop and Arabic songs. Parallel noted 15375v, observing signal splash at 1259 on 11885. (Serra, Italy)

1243 UTC on 15445

BRAZIL: Radio Nacional do Brasil. Report on a tour of the Brazilian Navy Museum and restoring military vessels. (Fraser, MA; Elmer W. Wallesen, La Grange Park, IL)

1345 UTC on 15240

SWEDEN: Radio Sweden. *Sounds Nordic* program with report on a hot rod show in Stockholm. (Fraser, MA) Program noted on 6065 at 1935 with *Sixty Degrees North* program, pop music breaks and IDs. (Serra, Italy)

1428 UTC on 13620

KUWAIT: Radio Kuwait. Arabic music program to announcer's Arabic text. (Howard Moser, Lincolnshire, IL) *Kuwait can also be heard in English from 1800-2100 on 11990*. -ed.

1451 UTC on 7370v

TURKEY: Turkiye Polis Radyosu (tent). Local song to female host. Regional music with brief announcer comment between tunes, no ID noted. (Serra, Italy)

1600 UTC on 15520.27

BANGLADESH: Radio Bangladesh. Time pips at 1600 to male time check,

ID, news from 1600-1610, including closing news round-up of main points. Some interference splatter observed. (Serra, Italy)

1620 UTC on 7445

TAIWAN: Voice of Asia. Presumed Thai. News text to easy-listening vocals. Additional text referring to Indonesia and Hong Kong to 1630. (Witham, HI)

1650 UTC on 13830

CROATIA: Croatian Radio. Piano music to 1700 ID and national news in presumed Croatian. (Moser, IL) Ten minutes of Croatian news heard on 7165 at 2205. "Hrvatska Radio" ID, excellent signal on //5895. (Hanz, NJ) Audible on 5920 at 0758-0805 in Croatian and English, //9830, 13830. (Serra, Italy)

1650 UTC on 17775

SAUDI ARABIA: BSKSA. Presumed Swahili. Rapid monologue to regional music at 1652. Closing national anthem at 1655, revealing KVOH-Los Angeles underneath! (Witham, HI)

1710 UTC on 7295

MALAYSIA: (Peninsular Malaysia) RTM-Radio 4. Pop vocals from George Michael. Excerpts from the album *Words*, including the cut *Radio Moments*. ID to comments that Radio 4 is being heard in market places, public parks and medical clinics. (Witham, HI)

1752 UTC on 13845

USA: WWCR. Dr. Gene Scott's University Network ID/info, monitored to 1800. (Breitkopf, Canada)

1820 UTC on 7170

RUSSIA: Golos Rossii. Russian. Emotional telephone conversations handled very well by a female announcer. Russian music past 1830 with ID at 1832. (Witham, HI)

1832 UTC on 7270

ALBANIA: Radio Tirana. Newscast to 1835 and brief musical pause. ID, political commentary about situation in Kosovo to 1838. Interviews, talk and pop music. ID and info for closing English service at 1856, heard on // 9739.87. (Serra, Italy)

1906 UTC on 15665

USA: Monitor Radio Int'l. Station ID into Middle Eastern news to religious text. Station information and address. (Breitkopf, CAN)

1915 UTC on 11605

ISRAEL: Kol Israel. Report on the various Holocaust memorials. (Fraser, MA) //7465, 9435, 15615, 15640-ed.

1920 UTC on 11675

RUSSIA: Voice of Russia WS. *Moscow Mailbag*-FAQ's (Frequently Asked Questions reviewed). (Fraser, MA) Fine signal noted on 12010 at 0420. (Moser, IL) *Focus on Asia* heard on 7115 at 0027. (Wilden, IN)

1931 UTC on 5015

TURKMENISTAN: Turkmen Radio. Turkmen. Local chant to presumed political talk mentioning Ashgabat to 1940. Some QRM static noted. Serra, Italy)

1945 UTC on 9670

ITALY: RAI. Survey finds job security the top requirement of workers. (Fraser, MA) Italian service noted on 11810 at 2320. (Moser, IL) //7235, 11905-ed.

2005 UTC on 12085

SYRIA: Radio Damascus. Arabic vocals mixed with program preview to "this is Radio Damascus". National anthem to news in brief, Arabic pop songs, IDs and *News and Views* show. *Press Review* program and lite music. End of English service noted with frequency quote, ID and closing national anthem, //15095. (Serra, Italy)

2035 UTC on 11980

USA: KWHH-Hawaii. Pop music to female announcer's religious programming of prayers and bible passages. QSL request from listeners to ID. (Breitkopf, CAN)

2056 UTC on 7230

SERBIA: Radio Yugoslavia. Weak signal with frequency quote to station interval signal and sign-off. (Hanz, NJ) *Station is targeted to Australia at this time, check out North America's target at 0000-0030 on 9580//11870*. -ed

2135 UTC on 11720

BULGARIA: Radio Bulgaria. Report on the evolution of Bulgaria's national character. (Fraser, MA) // 9700-ed.

2159 UTC on 17860

AUSTRALIA: Radio Australia. Station ID/frequency info to features. (Breitkopf, CAN) Chinese service noted on 13605 at 13415. (Moser, IL)

2230 UTC on 11935

JORDAN: Radio Jordan. Arabic. Middle Eastern news briefs to big band music. (Moser, IL) *Jordan can also be heard in English from 1100-1200, 1400-1500, 1500-1600, 1600-1630 on 11970*. -ed.

2240 UTC on 9655

TURKEY: Voice of Turkey. Report on sharing the Euphrates River waters among Turkey, Syria and Iraq. //11810. (Fraser, MA)

Thanks to our contributors — Have you sent in YOUR logs?

Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gayle@grove.net) English broadcast unless otherwise noted.

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BRAZIL

Radio Cancao Nova, 9675 kHz. Full data *E Hora de Evangelizar* QSL card unsigned plus letter and *Cacao Nova Jornal* newsletter. Received in 77 days for a Portuguese report and one U.S. dollar. Station address: Caixa Postal 15, 12630 Cachoeira Paulista, Sao Paulo SP, Brazil. (Darren White, Hattiesburg, MS)

COSTA RICA

Radio For Peace International, 7385 kHz. Full data QSL card signed by James Latham. Received in 45 days for an English report and two U.S. dollars. Station address: P.O. Box 88, Santa Ana, Costa Rica. (Terry Jones, Plankinton, SD)

ECUADOR

Escuelas Radiofonicas Populares del Ecuador, 5010 kHz. Partial data verification letter on station letterhead, signed by Juan Perez Sarmiento, plus station sticker. Received in 54 days for a Spanish report and one U.S. dollar. Station address: Casilla 06-01-693, Riobamba, Ecuador. (White, MS)

La Voz de los Caras, 4795 kHz. Partial data verification letter on station letterhead signed by Ing. Marcelo Nevarez Faggioui. Received in 64 days for a Spanish report and one U.S. dollar. Station address: Casilla 13-01-629, Bahiade Caraquez, Manabi, Ecuador. (White, MS).

GREECE

Voice of Greece, 15650 kHz. Full data QSL card unsigned and frequency schedule enclosed. Received in 53 days for an English report and one U.S. dollar. Station address: ERT S.A., Direction of Engineering & Development, P.O. Box 60019 153 10 Aghia Paraskevi Attikis, Athens, Greece. (Walter Szczepaniak, Philadelphia, PA)

HONG KONG

Hong Kong Telecom, 3940 kHz. Full data QSL folder with transmitter site, and photo signed by Lui Kam Chuen-Asst. Engineer. Received in 1 month for an English report. Station address: HF Radio Transmitting Station, P.O. Box 9896, GPO Hong Kong. (Ed Rausch, Cedar Grove, NJ)

ICELAND

Rikisutvarpid, 1380 kHz. Full data QSL postcard unsigned. Received in 35 days for a taped Icelandic report and one IRC. Station address: Icelandic National Broadcasting Service, Efstalet 11, 150 Reykjavik, Iceland. (Szczepaniak, PA)

MEDIUMWAVE

Radio Progreso (CMBB), 640-AM kHz. Full data verification on station letterhead signed by Manuel E. Andres Mazorra-Director General, stamped with station's seal. Received for a Spanish report. Station address: Infanta 105, Apartado 3042, Ciudad De La Habana, Cuba (Philip E. Galasso, West Creek, NJ)

WCTJ, 1580 (ex-WWOV)/ WLOJ 1490 AM kHz (Camp Lejeune, NC). Data/frequency letter, returned both reports, and enclosed bumper stickers for each station. Received in 44 days for report of testing on 23 April. Enclosed both a address label and mint stamps (neither used on reply). Station address: WCTJ, c/o Leann Wilson-Office Manager, Light 1490 WLOJ, P.O. Box 15062, New Bern, NC 28561. This report was sent via WLOJ as noted WCTJ broadcast // with WLOJ's programming. (Mike Hardester, Jacksonville, NC)

NETHERLANDS ANTILLES

Radio Netherlands Bonaire relay station, 5995 kHz. Full data QSL card unsigned plus three calendars. Received in 30 days for an English report and two IRCs. Station address: P.O. Box 222, 1200 JG Hilversum, The Netherlands. (Jones, SD; Eric M. Walton, Vancouver BC, Canada)

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

Radio Pyongyang, 6576 kHz. Full data *Lily of the Valley* flower picture postcard, verified with initials. Station pennant, calendar card, program schedule, picture leaflet of their Central Broadcasting complex, and a copy of *Pyongyang Times*. The catch is, that I had to mail my report from outside the United States. I was in Havana in January and mailed the report from there. Station address: c/o External Service, Korean Central Broadcasting Station, Pyongyang, Democratic People's Republic of Korea. (not "North Korea" on envelope please!) (Galasso, NJ) *Kudos, Philip!*

RUSSIA

Voice of Russia, 9955 kHz. Full data scenery card verified by Elena. Transmitter site noted as Lvov-Ukraine. Received in 59 days for an English report. Station address: ul. Pyatnitskaya 25, Moscow 113326, Russia. (John Hanz, Old Brige, NJ)

SHIP TRAFFIC

S/S Keystone Canyon KSKF, 12487.5 kHz USB (Steam Tanker). Full data prepared QSL card signed and stamped with ship's seal. Received in 21 days for a utility report of RTTY traffic. Ship address: c/o Keystone Shipping Co., 313 Chestnut St., Philadelphia, PA 19106. (Steve McDonald, Port Coquitlam, BC, Canada)

M/V Stewart J. Cort WY23931, 4077 kHz USB (Ore Carrier). Full data prepared QSL card stamped with ship's seal and signed. Personal note and two color photos of ship enclosed. Received in 55 days for an English utility report. Ship address: c/o Canal Station, Sault Ste. Marie, Michigan, 49783. (McDonald, CAN)

M/V Pacific King 3FJN4, 12439 kHz USB (Bulk Carrier). Full data prepared QSL card stamped with ship's seal and signed. Received in 59 days for a utility report of CW traffic. Ship address: c/o Hyundai Merchant Marine Co., 4-10th Floor, Mukyo Hyundai Bldg., 96, Mukyo-Dong Chung-Ku, Seoul, South Korea. (McDonald, CAN)

UNITED STATES

KTRK-K-Truck, 1670 kHz. Full data green/white 8x10 U.S. Army Broadcasting Service-Verification Certificate, signed by Mr. Donald S. Browne-Project Manager, Col. Thomas A. Hansen-Director-Army Broadcasting Service. Very nice certificate and suitable for framing! Received in 106/91/96 days for an English report. (Hardester, NC via e-mail; Richard Baker, OH via e-mail; Loyd Van Horn, Brasstown, NC)

How to Use the Shortwave Guide

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Daylight Time) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (8:30 pm Eastern, 5:30 pm Pacific).

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings except for the "Newsline" listing, which begins on the next page.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the

station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am: The Americas	as: Asia
na: North America	au: Australia
ca: Central America	pa: Pacific
sa: South America	va: various
eu: Europe	do: domestic broadcast
af: Africa	om: omnidirectional
me: Middle East	

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

RADIO PROGRAMS

COMPILED BY JIM FRIMMEL

Sundays		1805	Radio Vlaanderen Intl: "Radio World"	1615	KTWR (Guam): "Pacific DX Report"	1130	WWCR #1 (Tennessee): "World of Radio"
0024	Radio Exterior de Espana: "Distance Unknown"	1830	KWHR (Hawaii): "DXing with Cumbre"	1840	All India Radio: "DX-ers Corner (2/4)"	1315	FEBC (Philippines): "DX Dial"
		1840	Radio Korea: "Shortwave Feedback"	1915	Radio Tallinn: "Radio Estonia DX Program"	1720	Polish Radio: "Polish Radio DX Club"
0030	Voice of America (ca): "Communications World"	1930	Radio Korea: "Shortwave Feedback"	1920	AWR Latin America: "Wavescan"	1915	Radio Budapest Intl: "Radio Budapest DX Show"
		2010	Radio Korea: "Shortwave Feedback"	1955	Radio Romania Intl: "For Radio Amateurs"		
0030	WRMI (Florida): "Wavescan"	2105	Radio Vlaanderen Intl: "Radio World"	2030	WWCR #1 (Tennessee): "World of Radio"	1920	Argentina, RAE: "DX'ers Special"
0100	WRMI (Florida): "Wavescan"	2115	Radio Budapest Intl: "Radio Budapest DX Show"	2045	Radio Dnestr: "DX Herald (3)"	1930	HCJB (eu): "Ham Radio Today"
0109	HCJB (am): "DX Partyline"			2130	All India Radio: "DX-ers Corner (2/4)"	2000	HCJB (eu): "The Latest Catch"
0124	Radio Exterior de Espana: "Distance Unknown"	2125	Radio Japan: "Media Roundup"	2130	WRMI (Florida): "Wavescan"	2130	WRMI (Florida): "Wavescan"
		2130	Radio Korea: "Shortwave Feedback"	2155	Radio Romania Intl: "For Radio Amateurs"		
0200	WWCR #3 (Tennessee): "Spectrum"	2130	WWCR #4 (Tennessee): "World of Radio"	2355	Radio Romania Intl: "For Radio Amateurs"		
0200	WWCR #4 (Tennessee): "Spectrum"	2149	Radio Bulgaria: "Radio Bulgaria Calling"			Thursdays	
0200	Radio For Peace Intl: "World of Radio"	2206	WWCR #3 (Tennessee): "Ham Radio and More"	Tuesdays		0030	WRMI (Florida): "Wavescan"
0234	Radio Havana Cuba: "DXers Unlimited"			0030	WRMI (Florida): "Wavescan"	0115	Radio Budapest Intl: "Radio Budapest DX Show"
0249	Radio Romania Intl: "DX Mailbag"	2206	WWCR #4 (Tennessee): "Ham Radio and More"	0255	Radio Romania Intl: "For Radio Amateurs"	0130	HCJB (am): "Ham Radio Today"
0258	Vatican Radio: "On-the-Air"			1146	Radio Sweden: "MediaScan (1/3)"	0153	Radio Netherlands Intl: "Media Network"
0300	WHRI (Angel 2): "DXing with Cumbre"	2215	AWR-Europe (Slovakia): "Wavescan"	1210	AWR Latin America: "Wavescan"	0200	HCJB (am): "The Latest Catch"
0300	WWCR #4 (Tennessee): "World of Radio"	2300	AWR Latin America: "Wavescan"	1230	WWCR #1 (Tennessee): "World of Radio"	0235	Argentina, RAE: "DX'ers Special"
0315	Voice of Turkey: "DX Corner (biweekly)"	2300	KSDA (Guam): "Wavescan"	1246	Radio Sweden: "MediaScan (1/3)"	0530	HCJB (am): "Ham Radio Today"
0410	Australia, Radio: "Feedback"	2300	Radio For Peace Intl: "World of Radio"	1846	Radio Sweden: "MediaScan (1/3)"	0600	HCJB (am): "The Latest Catch"
0434	Radio Havana Cuba: "DXers Unlimited"	2325	Radio Japan: "Media Roundup"	1900	Radio For Peace Intl: "World of Radio"	0752	Radio Netherlands Intl: "Media Network"
0508	Vatican Radio: "On-the-Air"	2335	Radio Vlaanderen Intl: "Radio World"	1946	Radio Sweden: "MediaScan (1/3)"	0830	Radio New Zealand Intl: "Mailbox (biweekly)"
0509	HCJB (am): "DX Partyline"			1950	Polish Radio: "Polish Radio DX Club"		
0524	Radio Exterior de Espana: "Distance Unknown"	Mondays		2130	WRMI (Florida): "Wavescan"	0953	Radio Netherlands Intl: "Media Network"
		0030	WRMI (Florida): "Wavescan"	2139	Radio Havana Cuba: "DXers Unlimited"	1153	Radio Netherlands Intl: "Media Network"
0525	Radio Japan: "Media Roundup"	0125	Radio Japan: "Media Roundup"	2146	Radio Sweden: "MediaScan (1/3)"	1220	Polish Radio: "Polish Radio DX Club"
0610	Australia, Radio: "Feedback"	0200	WHRI (Angel 2): "DXing with Cumbre"	2239	Radio Havana Cuba: "DXers Unlimited"	1315	WRMI (Florida): "Wavescan"
0630	Radio Korea: "Shortwave Feedback"	0230	Radio Korea: "Shortwave Feedback"	2340	All India Radio: "DX-ers Corner (2/4)"	1352	Radio Netherlands Intl: "Media Network"
0634	Radio Havana Cuba: "DXers Unlimited"	0245	Radio Budapest Intl: "Radio Budapest DX Show"	Wednesdays		1553	Radio Netherlands Intl: "Media Network"
0635	Radio Vlaanderen Intl: "Radio World"			0030	WRMI (Florida): "Wavescan"	1753	Radio Netherlands Intl: "Media Network"
0725	Radio Japan: "Media Roundup"	0330	KWHR (Hawaii): "DXing with Cumbre"	0046	Radio Sweden: "MediaScan (1/3)"	1952	Radio Netherlands Intl: "Media Network"
0800	WWCR #1 (Tennessee): "World of Radio"	0405	WWCR #3 (Tennessee): "Ham Radio and More"	0116	Radio Sweden: "MediaScan (1/3)"	2030	WWCR #1 (Tennessee): "World of Radio"
0830	Radio Korea: "Shortwave Feedback"			0135	Radio Havana Cuba: "DXers Unlimited"	2130	WRMI (Florida): "Wavescan"
0900	Radio For Peace Intl: "World of Radio"	0430	Radio New Zealand Intl: "Mailbox (biweekly)"	0146	Radio Sweden: "MediaScan (1/3)"		
0900	WWCR #3 (Tennessee): "World of Radio"			0246	Radio Sweden: "MediaScan (1/3)"	Fridays	
1040	Radio Korea: "Shortwave Feedback"	0430	WWCR #1 (Tennessee): "World of Radio"	0300	Radio For Peace Intl: "World of Radio"	0030	WRMI (Florida): "Wavescan"
1100	AWR Latin America: "Wavescan"	0445	Radio Bulgaria: "Radio Bulgaria Calling"	0335	Radio Havana Cuba: "DXers Unlimited"	0053	Radio Netherlands Intl: "Media Network"
1130	Radio ABC Denmark: "ABCDX-Report"	0700	Radio For Peace Intl: "World of Radio"	0346	Radio Sweden: "MediaScan (1/3)"	0053	Radio Netherlands Intl: "Media Network"
1230	Radio Korea: "Shortwave Feedback"	0800	WWCR #1 (Tennessee): "Spectrum"	0535	Radio Havana Cuba: "DXers Unlimited"	0253	Radio Netherlands Intl: "Media Network"
1235	Radio Vlaanderen Intl: "Radio World"	0905	WWCR #1 (Tennessee): "Ham Radio and More"	0700	HCJB (eu): "The Latest Catch"	0453	Radio Netherlands Intl: "Media Network"
1240	Radio Korea: "Shortwave Feedback"			0700	HCJB (eu): "The Latest Catch"	1315	WRMI (Florida): "Wavescan"
1352	Vatican Radio: "On-the-Air"	1040	All India Radio: "DX-ers Corner (2/4)"	0800	HCJB (eu): "Ham Radio Today"	1446	Radio Portugal Intl: "Radio Portugal DX (triweekly)"
1425	Radio Japan: "Media Roundup"	1215	Radio Bulgaria: "Radio Bulgaria Calling"	0930	HCJB (pac): "Ham Radio Today"		
1630	Radio Korea: "Shortwave Feedback"	1355	Radio Romania Intl: "For Radio Amateurs"	1000	Radio For Peace Intl: "World of Radio"		
1725	Radio Japan: "Media Roundup"	1435	All India Radio: "DX-ers Corner (2/4)"	1030	HCJB (pac): "The Latest Catch"		
1730	WWCR #3 (Tennessee): "World of Radio"	1525	Radio Romania Intl: "For Radio Amateurs"				

(Continued on p. 56)

(Continued on p. 56)

**Gayle Van Horn, Frequency Manager**

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MT MONITORING TEAM

Next Reporting Deadline

August 18, 1996

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Texas

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Jacques d'Avignon

Propagation Forecasts

Ontario, Canada

monitor@limestone.kosone.com

NEWSLINE

"Newsline" is your guide to news broadcasts on the air. • All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. • All broadcasts are daily unless otherwise noted by the day codes.

0000 UTC**(8:00 PM EDT, 5:00 PM PDT)**

BBC (am) (Newsdesk)
 BBC (as pac) (Newsdesk)
 BBC (south as)
 Canada (North-Quebec)
 China Radio Intl
 Monitor Radio Intl [T-A]
 Radio Australia
 Radio Exterior de Espana
 Radio New Zealand Intl
 Radio Prague
 Radio Thailand
 Radio Ukraine Intl
 Radio Yugoslavia [M-A]
 Voice of America (am)
 Voice of America (as)
 Voice of America (ca)
 Voice of Russia
 WWCR #4 (Tennessee) [T-A]
 (USA)
 0001
 Croatian Radio
 0003
 Radio Pyongyang
 0010
 China Radio Intl*
 Voice of America (ca) [T-A]*
 0015
 Radio Cairo
 0030
 All India Radio
 Radio Netherlands Intl
 Radio Sweden [T-A]
 Radio Thailand [T-S]
 Radio Vilnius [M-A]
 Voice of America (am) [T-S]
 (Special English)
 Voice of America (as) (Special English)
 Voice of Russia
 0035
 Voice of Iran
 0045
 BBC (am)* (Britain Today)
 BBC (as pac)* (Britain Today)
 BBC (south as)* (Britain Today)
 0050
 RAI Intl Italy

0100 UTC**(9:00 PM EDT, 6:00 PM PDT)**

BBC (am) (Newsdesk)
 BBC (as pac) (Newsdesk)
 BBC (south as) (Newsdesk)
 Canada (North-Quebec) [S]
 Deutsche Welle
 HCJB (am)
 Monitor Radio Intl [T-A]
 Radio Australia
 Radio Budapest
 Radio Canada Intl
 Radio Exterior de Espana
 Radio Havana Cuba [T-S]
 Radio Japan
 Radio New Zealand Intl
 Radio Norway Intl [M]

Radio Prague
 Radio Sweden [T-A]
 Radio Tashkent
 Swiss Radio Intl
 Voice of America (am)
 Voice of America (as)
 Voice of America (ca)
 Voice of Indonesia [F]
 Voice of Russia
 Voice of Vietnam
 0101
 Croatian Radio
 0103
 R Slovakia Intl [T-S]
 0110
 Radio Australia [M-F]*
 0113
 Radio Havana Cuba [T-S]*
 0130
 BBC (as pac)
 BBC (south as)
 Radio Austria Intl
 Radio Havana Cuba [W-S]
 Radio Netherlands Intl
 Radio Sweden [T-A]
 Voice of Greece
 Voice of Russia [T-A]
 Voice of Vietnam
 0132
 Radio Havana Cuba [T]
 0145
 Radio Tirana
 0152
 Vatican Radio
 0155
 Radio Canada Intl [T-A]
 Voice of Indonesia [F]

0200 UTC**(10:00 PM EDT, 7:00 PM PDT)**

BBC (af) (Newsday)
 BBC (am) (Newsday)
 BBC (as pac) (Newsday)
 BBC (eu) (Newsday)
 BBC (south as) (Newsday)
 Canada (North-Quebec)
 Deutsche Welle
 Monitor Radio Intl [T-A]
 Radio Australia
 Radio Canada Intl
 Radio Havana Cuba [T-S]
 Radio Korea
 Radio New Zealand Intl [T-A]
 Radio Romania Intl
 RAE Argentina [T-A]
 Voice of America (as)
 Voice of Myanmar (Burma)
 Voice of Russia
 Voice of Vietnam
 WHRI (Angel 2) [T-A] (UPI)
 WWCR #3 (Tennessee) [T-A]
 (USA)
 WWCR #4 (Tennessee) [T-A]
 (USA)
 0201
 Croatian Radio
 0203
 Voice of Free China
 0213
 Radio Havana Cuba [T-S]*
 0215
 Radio Cairo
 Radio Nepal
 0228
 Radio Havana Cuba [S]
 0230
 Radio Austria Intl
 Radio Budapest
 Radio Havana Cuba [T-A]
 Radio Netherlands Intl
 Radio Pakistan
 Radio Portugal Intl [T-A]
 Radio Sweden [T-A]
 Radio Tirana
 Voice of Russia
 Voice of Vietnam
 0300 UTC
 (11:00 PM EDT, 8:00 PM PDT)
 BBC (af)
 BBC (am)
 BBC (as pac)
 BBC (eu) [S-F]
 BBC (south as)
 Canada (North-Quebec)
 Channel Africa
 China Radio Intl
 Deutsche Welle
 Monitor Radio Intl [T-A]
 Radio Australia
 Radio Havana Cuba [T-S]
 Radio Japan
 Radio New Zealand Intl [M-A]
 Radio Prague
 Radio Thailand
 Radio Ukraine Intl
 Voice of America (af) [A-S]
 Voice of Russia
 Voice of Turkey
 WHRI (Angel 2) [T-A] (UPI)
 WWCR #3 (Tennessee) [T-A]
 (USA)
 WWCR #4 (Tennessee) [T-A]
 (USA)
 0301
 Croatian Radio
 Voice of America (af) [M-F]*
 0303
 Voice of Free China
 0310
 China Radio Intl*
 0313
 Radio Havana Cuba [T-S]*
 0315
 Radio Cairo
 0320
 Radio Philippines [M-A]
 Vatican Radio [T-S]
 0330
 BBC (af) [A-S]* (African News)
 BBC (eu) [A]
 Radio Dubai
 Radio Havana Cuba [T-S]
 Radio Prague

Radio Sweden [T-A]
 Voice of America (af) [M-F]
 (Special English)
 Voice of Russia
 0333
 R Slovakia Intl [T-S]
 0340
 Voice of Greece
 0355
 Radio Japan [W-M]

0400 UTC**(12:00 AM EDT, 9:00 PM PDT)**

BBC (af) (Newsdesk)
 BBC (am) (Newsdesk)
 BBC (as pac) (Newsdesk)
 BBC (eu) [S-F] (Newsdesk)
 BBC (south as) (Newsdesk)
 Canada (North-Quebec)
 Channel Africa
 China Radio Intl
 Deutsche Welle
 Monitor Radio Intl [T-A]
 Radio Australia
 Radio Bulgaria
 Radio Canada Intl
 Radio Havana Cuba [T-S]
 Radio New Zealand Intl [A]
 Radio New Zealand Intl [M-F]*
 Radio Norway Intl [M]
 Radio Romania Intl
 Radio Tanzania
 Swiss Radio Intl
 Voice of America (af)
 Voice of America (me)
 Voice of Israel
 Voice of Russia
 WWCR #3 (Tennessee) [M]
 (USA)
 WWCR #4 (Tennessee) [T-A]
 (USA)
 WYFR (Satellite Network) [A]
 ZBC Zimbabwe
 0401
 Croatian Radio
 0403
 Radio Pyongyang
 0410
 China Radio Intl*
 0413
 Radio Havana Cuba [T-S]*
 0425
 RAI Intl Italy
 0430
 BBC (af) [A-S]* (African News)
 BBC (eu) [A] (Newsdesk)
 Radio Havana Cuba [T-A]
 Radio Netherlands Intl
 Radio Yugoslavia
 Voice of Russia
 0431
 Voice of America (af) [M-F]*

BBC (am) (Newsday)
 BBC (as pac) (Newsday)
 BBC (eu) (Newsday)
 BBC (south as) (Newsday)
 Canada (North-Quebec)
 Channel Africa
 Deutsche Welle
 HCJB (am)
 Monitor Radio Intl [T-F]
 Radio Australia
 Radio Cameroon
 Radio Canada Intl [M-F]
 Radio Exterior de Espana
 Radio Havana Cuba [T-S]
 Radio Japan
 Radio New Zealand Intl [S-F]
 Vatican Radio [A]
 Voice of America (af)
 Voice of America (me)
 Voice of Russia
 WWCR #1 (Tennessee) [T-A]
 (USA)
 0510
 Radio Australia [M-F]*
 0513
 Radio Havana Cuba [T-S]*
 0520
 Radio Australia [M]*
 0530
 BBC (af) [A-S]* (African News)
 Radio Austria Intl
 Radio Romania Intl
 Radio Romania Intl
 Voice of Nigeria
 Voice of Russia
 0555
 Radio Japan [A]

0600 UTC**(2:00 AM EDT, 11:00 PM PDT)**

BBC (af)
 BBC (am) [M-A]
 BBC (as pac)
 BBC (eu)
 BBC (south as)
 Deutsche Welle
 Monitor Radio Intl [T-F]
 Radio Australia
 Radio Havana Cuba [T-S]
 Radio Japan
 Radio Korea
 Radio New Zealand Intl [M-A]
 Radio Norway Intl [S]
 Swiss Radio Intl
 Voice of America (af) [A-S]
 Voice of America (me)
 Voice of Kenya
 Voice of Russia
 WWCR #1 (Tennessee) [S]
 (USA)
 0601
 Voice of America (af) [M-F]*
 0603
 Radio Pyongyang
 0613
 Radio Havana Cuba [T-S]*
 0615

Swiss Radio Intl (eu)
0630
BBC (af) [A-S]* (African News)
Radio Austria Intl
Radio Havana Cuba [T-S]
Radio Vlaanderen Intl
Vatican Radio [H]
Voice of Nigeria [M-F]
Voice of Russia
0631
Radio Romania Intl
0645
Radio Romania Intl
Voice of Nigeria [T-F]*
0655
Radio Japan [W-M]

0700 UTC (3:00 AM EDT, 12:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Monitor Radio Intl [T-F]
Papua New Guinea
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Radio Prague
Voice of Malaysia
Voice of Myanmar (Burma)
Voice of Russia
WWCR #3 (Tennessee) [M-F] (USA)
0703
Croatian Radio
Radio Pyongyang
Voice of Free China
0710
Radio Australia [M-F]*
0715
Swiss Radio Intl (eu)
0717
Radio New Zealand Intl [H]*
0720
Radio Australia [M]*
0730
HCJB (eu)
Radio Austria Intl
Radio Netherlands Intl
Voice of Greece
Voice of Russia [T-A]
0750
Russia (Radio Pacific Ocean) [A]
0755
Radio Japan

0800 UTC (4:00 AM EDT, 1:00 AM PDT)

BBC (af)
BBC (as pac)
BBC (eu)
BBC (south as)
KNLS (Alaska)
Monitor Radio Intl [M-A]
Radio Australia
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [S]
Radio Pakistan
Voice of Indonesia [A-H]
Voice of Malaysia
Voice of Russia
0803
Croatian Radio
Radio Pyongyang
0810
Radio New Zealand Intl [M-F]*
0830
R Slovakia Intl [M-A]
Radio Netherlands Intl
Voice of Russia
0832

R Slovakia Intl [T]*
0855
Voice of Indonesia [A-H]

0900 UTC (5:00 AM EDT, 2:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
China Radio Intl
Deutsche Welle
HCJB (pac)
Monitor Radio Intl [M-A]
Papua New Guinea [M]*
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Radio Prague
Radio Vlaanderen Intl [M-A]
Swiss Radio Intl
Voice of Russia
WWCR #1 (Tennessee) [M-F] (USA)
0903
Croatian Radio
0910
China Radio Intl*
Radio Australia [M-F]*
0930
FEBC (Philippines) [M-A]
Radio Austria Intl [M-A]
Radio Finland
Radio Netherlands Intl
Voice of Russia
0945
Deutsche Welle [M-F]* (African News)
0955
Radio Japan

1000 UTC (6:00 AM EDT, 3:00 AM PDT)

All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
China Radio Intl
Monitor Radio Intl
Papua New Guinea
Radio Australia
Radio New Zealand Intl [S-F]
Radio Tanzania
Voice of America (as)
Voice of America (ca)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-F] (UPI)
WHRI (Angel 2) [M-A] (UPI)
WYFR (Satellite Network) [M-A]
1010
China Radio Intl*
1015
Radio New Zealand Intl [M-F]*
1020
Radio New Zealand Intl [H]*
Vatican Radio [M-A]
1030
FEBC (Philippines) [M-F]*
Radio Austria Intl
Radio Dubai
Radio Finland
Radio Korea
Radio Netherlands Intl
Radio Prague
Voice of Nigeria
Voice of Russia
1045
Voice of Nigeria [A-S]*

1100 UTC (7:00 AM EDT, 4:00 AM PDT)

BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [A-S]
Deutsche Welle
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Ghana [A-S]
Radio Japan
Radio New Zealand Intl (Newsdesk)
Radio Pakistan
Radio Singapore Intl
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WGTG (Georgia) [M-A] (USA)
WHRI (Angel 2) [A] (UPI)
WWCR #1 (Tennessee) [A] (USA)
WYFR (Satellite Network) [M-F]
1102
Radio Mozambique
1103
Radio Pyongyang
1110
Radio Australia*
1130
Radio Austria Intl
Radio Bulgaria
Radio Finland [M-F]
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Voice of Asia
Voice of Russia
WYFR (Satellite Network) [M-F]
1135
Voice of Iran
1145
Deutsche Welle [M-F]* (African News)
1155
Radio Japan [S-F]

1200 UTC (8:00 AM EDT, 5:00 AM PDT)

BBC (af) [M-A]
BBC (am)
BBC (as pac) [M-A]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Papua New Guinea
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio Canada Intl
Radio France Intl
Radio Jordan
Radio Korea
Radio New Zealand Intl [H-T]
Radio Norway Intl [S]
Radio Singapore Intl
Radio Tashkent
Voice of America (as)
Voice of Russia
WGTG (Georgia) [M-A] (USA)
WWCR #4 (Tennessee) [A] (UPI)
WYFR (Satellite Network) [M-F]
1203
Voice of Free China
1204

HCJB (am) [M-F]
1210
China Radio Intl*
1215
BBC (af) [M-A]* (Britain Today)
BBC (as pac) [M-F]* (Britain Today)
BBC (eu)* (Britain Today)
BBC (south as) [M-A]* (Britain Today)
1230
HCJB (am) [M-F]*
Radio Bangladesh [S-M]
Radio Bulgaria
Radio Cairo
Radio Canada Intl
Radio Finland
Radio Korea [S-W/A]
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Radio Vlaanderen Intl [S]
Voice of Russia [M-A]
Voice of Turkey
Voice of Vietnam
WYFR (Satellite Network) [M-F]
1231
Radio France Intl [T]*
1240
Voice of Greece

1300 UTC (9:00 AM EDT, 6:00 AM PDT)

BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
BBC (south as) (Newshour)
Canada (North-Quebec) [A-S]
China Radio Intl
KNLS (Alaska)
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Canada Intl [S-F]
Radio Ghana
Radio Norway Intl [S]
Radio Prague
Radio Romania Intl
Radio Singapore Intl
Radio Tanzania [A-S]
Radio Vlaanderen Intl [M-A]
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (as)
Voice of Kenya
Voice of Russia
WGTG (Georgia) [S-F] (USA)
WHRI (Angel 2) [M-F] (UPI)
WWCR #4 (Tennessee) [A] (UPI)
WYFR (Satellite Network) [M-F]
1303
Croatian Radio
Radio Pyongyang
1310
China Radio Intl*
Radiobras [M-F]*
1324
HCJB (am) [M-F]
1328
Radio Cairo
1330
All India Radio
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Canada Intl
Radio Dubai
Radio Netherlands Intl
Radio Singapore Intl [T-S]
Radio Sweden [M-F]
Radio Tashkent
Voice of America (as) (Special English)

Voice of Russia
Voice of Vietnam
1335
FEBC (Philippines) [M-F]*
Voice of Greece
1355
Radio Singapore Intl [A-S]
Radio Singapore Intl [M-F]*

1400 UTC (10:00 AM EDT, 7:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio Canada Intl [S]
Radio France Intl
Radio Ghana
Radio Japan
Radio Pakistan
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
WGTG (Georgia) [A] (USA)
WWCR #3 (Tennessee) [M-F] (USA)
WWCR #4 (Tennessee) [A-S] (UPI)
1410
China Radio Intl*
1415
Radio Nepal
1424
HCJB (am) [M-F]
1430
FEBC (Philippines) [M-A]
Radio Netherlands Intl
Radio Portugal Intl [M-F]
Radio Romania Intl
RTM Morocco [S]
Voice of Myanmar (Burma)
Voice of Russia
WYFR (Satellite Network) [M-F]
1431
Radio France Intl [T]*
1445
All India Radio
Voice of Myanmar (Burma)
1455
Radio Japan [A]

1500 UTC (11:00 AM EDT, 8:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac) [A-S]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
Channel Africa
China Radio Intl
Estonian Radio [M-F]
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl [S]
Radio Japan
Swiss Radio Intl
Voice of America (as)
Voice of America (me)
Voice of Russia
WWCR #1 (Tennessee) [M-F] (USA)
WWCR #3 (Tennessee) [M-F] (USA)
WWCR #4 (Tennessee) [M-A] (USA)

WYFR (Satellite Network) [A]
1503
Radio Pyongyang
1510
China Radio Intl [W-M]*
1511
China Radio Intl [T]*
1530
All India Radio*
FEBA (Seychelles)
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Netherlands Intl
Voice of Nigeria [M-F]
Voice of Russia
1535
Voice of Iran
1555
Radio Japan [A]

1600 UTC (12:00 M EDT, 9:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio France Intl
Radio Jordan
Radio Korea
Radio Norway Intl [S]
Radio Pakistan
Radio Prague
Radio Tanzania
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Ethiopia
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-A]
WHRI (Angel 2) [A] (USA)
WRNO (Louisiana) [M-F]
(USA)
WWCR #3 (Tennessee) [M-A]
(USA)
WWCR #4 (Tennessee) [M-F]
(USA)
WYFR (Satellite Network) [M-A]
1610
China Radio Intl*
1612
Vatican Radio [S-F]
1615
Radio Tirana
Vatican Radio
1630
Channel Africa [F]*
R Slovakia Intl [M-A]
Radio Canada Intl
Radio Dubai
Voice of America (af) [M-F]*
Voice of America (as) (Special English)
Voice of America (me) (Special English)
Voice of Ethiopia
Voice of Russia [S-F]
1632
R Slovakia Intl [M]*
1633
Deutsche Welle [M]* (African News)
R Slovakia Intl [M-A]
1638
Deutsche Welle [T-F]* (African News)
1645
BBC (am) [S-F]* (Britain

Today)
BBC (as pac) [M-F]* (Britain Today)
BBC (eu) [M-F]* (Britain Today)
Radio Canada Intl [M-F]

1700 UTC (1:00 PM EDT, 10:00 AM PDT)

BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [M-A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
Monitor Radio Intl [M-A]
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio France Intl
Radio Japan
Radio Jordan
Radio New Zealand Intl [M-F]*
Radio Pakistan
Radio Prague
Swiss Radio Intl
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WRNO (Louisiana) [M-F] (UPI)
WWCR #3 (Tennessee) [M-F] (USA)
WWCR #4 (Tennessee) [M-F] (UPI)
1703
Radio Pyongyang
1710
China Radio Intl*
Radio Australia*
1730
Radio Austria Intl
Radio Netherlands Intl
Radio New Zealand Intl [M-F]*
Radio Romania Intl
Voice of Russia
WHRI (Angel 1) [M-F]
1740
BBC (af)* (African News)
1745
Voice of Armenia

1800 UTC (2:00 PM EDT, 11:00 AM PDT)

All India Radio
BBC (af) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio New Zealand Intl [M-F]*
Radio Norway Intl [S]
Radio Omdurman
Radio Tanzania
Radio Vlaanderen Intl
Radio Yemen
Swiss Radio Intl (eu)
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-F] (USA)
WWCR #3 (Tennessee) [M-F] (USA)
1802
Radio Mozambique
1815
Radio Bangladesh
1830

BBC (af) [A-S]* (African News)
Radio Korea [S-W/A]
Radio Kuwait
Radio Netherlands Intl
Radio New Zealand Intl [M-F]*
Radio Sweden [M-F]
Radio Tirana
Radio Yemen
Radio Yugoslavia
Voice of America (af) [A-S] (Special English)
Voice of America (me) (Special English)
Voice of Russia
Voice of Turkey
1832
R Slovakia Intl [M]*
1833
R Slovakia Intl [M-A]
1840
Voice of Greece [M-A]
1855
Radio New Zealand Intl [M]*

1900 UTC (3:00 PM EDT, 12:00 M PDT)

All India Radio
BBC (af)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
China Radio Intl
Deutsche Welle
Estonian Radio [M/H]
HCJB (eu)
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Japan
Radio Korea
Radio New Zealand Intl
Radio Riga Intl [A]
Radio Romania Intl
Radio Vilnius
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
Voice of Vietnam
WHRI (Angel 1) [M-F] (UPI)
WWCR #3 (Tennessee) [M-F] (USA)
WWCR #4 (Tennessee) [A-S] (UPI)
1910
China Radio Intl*
Radio Australia [M-F]*
Radiobras [M-F]*
1930
Deutsche Welle [M-F]* (African News)
Polish Radio [A-S]
Polish Radio [M-F]*
Radio Austria Intl
Radio Netherlands Intl
Radio New Zealand Intl [S-H]*
Radio Sweden [M-F]
1935
RAI Intl Italy
Voice of Iran

2000 UTC (4:00 PM EDT, 1:00 PM PDT)

BBC (af) (Newshour)
BBC (am)
BBC (as pac)
BBC (eu)
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [S]
Radio Portugal Intl [M-F]

Radio Prague
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Greece [M-A]
Voice of Indonesia
Voice of Nigeria [M-F]
Voice of Russia
WHRI (Angel 1) [M-F] (UPI)
WHRI (Angel 2) [M-F] (UPI)
WWCR #4 (Tennessee) [M-F] (USA)
2003
Radio Pyongyang
2007
Radio Damascus [S-F]
2010
China Radio Intl*
2025
RAI Intl Italy
2030
Radio Dnestr (Moldova) [M/W-H/A]
Radio Finland
Radio Netherlands Intl
Radio New Zealand Intl [S-H]*
Radio Riga Intl [M-F]
Radio Thailand
Radio Yugoslavia
Voice of Armenia
Voice of Russia
Voice of Vietnam
2055
Radio Canada Intl [M-F]
Voice of Indonesia [M]
2057
Radio Kuwait

2100 UTC (5:00 PM EDT, 5:00 PM PDT)

All India Radio
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
Canada (North-Quebec) [A-S]
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Cameroon
Radio Canada Intl
Radio Exterior de Espana
Radio Havana Cuba [M-A]
Radio Japan
Radio Korea
Radio New Zealand Intl [A-M/H]
Radio Romania Intl
Radio Ukraine Intl
Radio Vlaanderen Intl
Radio Yugoslavia
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WHRI (Angel 2) [W-F/T] (UPI)
WWCR #1 (Tennessee) [M-F] (USA)
WWCR #4 (Tennessee) [M-F] (USA)
2110
China Radio Intl*
2113
Radio Damascus
2115
BBC (af)* (Britain Today)
BBC (eu)* (Britain Today)
2120
Radio Cairo
2130
Radio Cairo
Radio Havana Cuba [M-A]*

Radio New Zealand Intl [S-H]*
Radio Sweden [M-F]
Voice of Russia [M-F]
2135
Voice of Iran

2200 UTC (6:00 PM EDT, 3:00 PM PDT)

All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
Canada (North-Quebec) [S]
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [M-A]
Radio New Zealand Intl [A-H]
Radio Norway Intl [S]
RAI Intl Italy
Voice of America (as)
Voice of Russia
Voice of Turkey
WHRI (Angel 2) [M-F]
WWCR #1 (Tennessee) [M-F] (USA)
WWCR #3 (Tennessee) [S-F] (USA)
WWCR #4 (Tennessee) [S-F] (USA)
2203
Croatian Radio
Voice of Free China
2210
China Radio Intl*
2215
Radio Cairo
2230
Radio Austria Intl
Radio Havana Cuba [M-A]*
Radio Prague
Voice of America (as) (Special English)
Voice of Russia
2240
Radio Cairo
Voice of Greece [S-F]

2300 UTC (7:00 PM EDT, 4:00 PM PDT)

All India Radio
BBC (af) [S-F]
BBC (am) [S-F]
BBC (as pac)
Canada (North-Quebec) [A]
Deutsche Welle
KWHRI (Hawaii) [M-F] (USA)
Monitor Radio Intl [M-A]
Radio Australia
Radio Bulgaria
Radio Canada Intl (The World at Six)
Radio Japan
Radio New Zealand Intl [F-A]
Radio Romania Intl
Voice of America (as)
Voice of Russia
WHRI (Angel 2) [M-F]
WWCR #4 (Tennessee) [M-F] (USA)
2301
Croatian Radio
2303
Radio Pyongyang
2315
Radio Cairo
2330
Radio Netherlands Intl
Radio New Zealand Intl [S-H]
Radio Vlaanderen Intl
Voice of Russia
Voice of Vietnam
2335
Voice of Greece [S-F]

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FREQUENCIES

0000-0030	Australia, Radio	11855as	13605pa	13745as	17750as	0000-0100	United Kingdom, BBC WS	5965as	5970sa	5975va	6175na
0000-0100 vl	Australia, VL8A Alice Spg	2310do						6195as	7265as	7325va	9410as
0000-0100 vl	Australia, VL8K Katherine	5025do						9590va	9915sa	11750sa	11955as
0000-0100 vl	Australia, VL8T Tent Crk	4910do				0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0015	Cambodia, Natl Voice of	11940as				0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	Canada, CBC N Quebec Svc	9625do				0000-0100	USA, KTNB Salt Lk City UT	15590am			
0000-0100	Canada, CFBC Montreal	6005do				0000-0100	USA, KWHR Naalehu HI	17510au			
0000-0100	Canada, CFRX Toronto	6070do				0000-0100	USA, Monitor Radio Intl	7535am	9430ca		
0000-0100	Canada, CFVP Calgary	6030do				0000-0100	USA, Voice of America	5995am	6130am	7215va	7405am
0000-0100	Canada, CHNX Halifax	6130do						9455am	9770va	9775am	11695am
0000-0100	Canada, CKZN St John's	6160do						13740am	17735va	17820va	
0000-0100	Canada, CKZU Vancouver	6160do				0000-0030	USA, Voice of America	6873va			
0000-0100	China, China Radio Intl	9710na	11655na	11715na	11760na	0000-0100	USA, WEWN Birmingham AL	5825eu	7425na	15375sa	
0000-0100	Costa Rica, Adv World R	7375am	9725am	15460am		0000-0100	USA, WGTG McCaysville GA	9400am			
0000-0027	Czech Rep, Radio Prague	5930na	7345na			0000-0100	USA, WHRI Noblesville IN	5745am			
0000-0030	Egypt, Radio Cairo	9900na				0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do			0000-0100	USA, WRMI/R Miami Intl	9955am			
0000-0045	India, All India Radio	7155as	9705as	9950as	11620as	0000-0100	USA, WRNO New Orleans LA	7355am			
		11660as				0000-0100	USA, WWCR Nashville TN	3215am	5065am	7435am	9475am
0000-0030	Kazakhstan, R Alma Ata	6230eu						13845am			
0000-0100	Lebanon, Voice of Hope	6280eu	9960eu			0000-0045	USA, WYFR Okeechobee FL	6085na	11855ca		
0000-0100	Malaysia, Radio	7295do				0003-0010	Croatia, Croatian Radio	5895eu	7165eu		
0000-0100	Malaysia, RTM Kuching	7160do				0030-0100	Australia, Radio	13605as	13755pa	15240pa	15365pa
0000-0100	Netherlands, Radio	6020na	6165na	9845na				15510as	17795pa	17860pa	
0000-0100	New Zealand, R NZ Intl	15115pa				0030-0100	Ecuador, HCJB	9745am			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na		0030-0100	Iran, VOIRI	6050na	9022na	9685na	
0000-0100	Palau, KHBN/Voice of Hope	9965as				0030-0056	Lithuania, Radio Vilnius	9560na			
0000-0100 vl	Papua New Guinea, NBC	9675do				0030-0100	Netherlands, Radio	9860na	11655na		
0000-0100	Philippines, FEBC/R Intl	15450as				0030-0100	Sri Lanka, Sri Lanka BC	15425as			
0000-0100	Russia, Voice of Russia WS	7070na	7125na	7240na	7250na	0030-0100	Sweden, Radio	6065am			
		9620na	9665na			0030-0100	Thailand, Radio	15370na			
0000-0030 mtwhfa	Serbia, Radio Yugoslavia	9580na	11870na			0035-0040	India, All India Radio	7110do	11830do	11870do	
0000-0100	Spain, R Exterior Espana	9540na				0038-0055 1&3rd m	Denmark, R Denmark Intl	7275na	7465ca	9560sa	
0000-0030	Thailand, Radio	9690af				0050-0100	Italy, RAI Intl	6005na	9675na	11800na	
0000-0100	Ukraine, R Ukraine Intl	7150na	9550na	9560na							

SELECTED PROGRAMS

Sundays

- 0004 Czech Rep, Radio Prague: Live in Prague.
 0005 UK, BBC London (south as): Spotlight. Focus on the theater.
 0009 Egypt, Radio Cairo: Egyptian Songs.
 0010 UK, BBC London (south as): Country Style. Wally Whyton plays a selection of the best in country music.
 0011 Russia, Voice of: Moscow Mailbag.
 0016 Ukraine, R Ukraine Intl: Hello from Kiev.
 0024 Spain, R Exterior de Espana: Distance Unknown.
 0025 UK, BBC London (south as): Words of Faith. People of all faiths share how their scripture gives authority and meaning to their lives.
 0030 UK, BBC London (am): Letter from America. Alistair Cooke shares his inimitable view of contemporary American life.
 0030 UK, BBC London (as pac): Folk Routes. Ian Anderson extends the range of folk music to include country, cajun and blues.
 0030 UK, BBC London (south as): Folk Routes. See S 0030.
 0030 USA, VOA Washington DC (ca): Communications World.
 0045 UK, BBC London (am/as pac/south as): Britain Today. News about Britain.
 0051 Lithuania, Radio Vilnius: Folk Music.

Mondays

- 0000 UK, BBC London (am): Chimes of Big Ben (1). Hear the famous bells at this time on the first Monday of each month.
 0000 UK, BBC London (as pac): Chimes of Big Ben (1). See M 0000.
 0005 UK, BBC London (south as): From Our Own Correspondent. See S 0030.
 0006 Czech Rep, Radio Prague: The Week and Politics.
 0011 Russia, Voice of: Moscow Mailbag.
 0013 Czech Rep, Radio Prague: From the Weeklies.
 0016 Yugoslavia, Radio: Weekly Concert.
 0019 Ukraine, R Ukraine Intl: Music from Ukraine.
 0025 UK, BBC London (south as): Words of Faith. See S 0025.
 0030 UK, BBC London (am): Development '96. See S 0615.
 0030 UK, BBC London (as pac/south as): On the Move. See S 0445.
 0030 USA, VOA Washington DC (am/ca): Spotlight.
 0030 USA, WRMI/R Miami Intl: Wavescan (M-F).
 0035 Netherlands, Radio (am): Sincerely Yours.
 0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Tuesdays

- 0000 USA, WHRI Noblesville IN (Angel 2): Jack McLamb Show (live) (T-A).
 0005 UK, BBC London (south as): New Ideas. See S 2330.
 0010 USA, VOA Washington DC (ca): NReport to the Caribbean (T-A).
 0011 Czech Rep, Radio Prague: Magazine '96.
 0025 UK, BBC London (south as): Words of Faith. See S 0025.
 0030 UK, BBC London (am): Global Concerns. See M 1230.
 0030 UK, BBC London (as pac/south as): Record News. See S 0445.
 0030 USA, VOA Washington DC (ca): Music USA (Standards).
 0032 Russia, Voice of: This is Russia.
 0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

Wednesdays

- 0005 UK, BBC London (south as): Pop Short. See S 0355.
 0010 UK, BBC London (south as): Youth. Your Questions of Faith. See T 1145.
 0025 UK, BBC London (south as): Words of Faith. See S 0025.
 0030 UK, BBC London (am): Folk Routes. See S 0030.
 0030 UK, BBC London (as pac/south as): Variable Feature. See S 1130.
 0030 USA, VOA Washington DC (ca): Now Music USA.
 0032 Russia, Voice of: Moscow Yesterday and Today.
 0040 UK, BBC London (as pac/south as): Science View. A five-minute science program.
 0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.
 0055 Lithuania, Radio Vilnius: Information for Visitors.

Thursdays

- 0005 UK, BBC London (south as): Take Five. See M 2310.
 0010 UK, BBC London (south as): Variable Feature. See S 1130.
 0013 Czech Rep, Radio Prague: From the Archives.
 0015 USA, WRMI/R Miami Intl: Viva Miami!
 0025 UK, BBC London (south as): Words of Faith. See S 0025.
 0030 UK, BBC London (am): From Our Own Correspondent. See S 0030.
 0030 UK, BBC London (as pac/south as): Jazz Now and Then. See S 1230.
 0030 USA, VOA Washington DC (ca): Now Music USA.

- 0032 Russia, Voice of: This is Russia.
 0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.
 0054 Radio Netherlands: Documentary. Living on the Land — Part 2 (1 Aug). A three part series. Part 2 examines crofting in the Scottish Highlands.
 0054 Radio Netherlands: Documentary. Living on the Land — Part 3 (8th). See W 1154.
 0054 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (15th). See A 2354.
 0054 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (22nd). See F 1454.
 0054 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (29th). See F 2354.

Fridays

- 0005 UK, BBC London (south as): The Insider's Guide. A look behind the scenes to bring the inside story about Bush House.
 0015 UK, BBC London (south as): Write On. See S 0345.
 0017 Czech Rep, Radio Prague: I'd Like You to Meet.
 0030 UK, BBC London (am/as pac/south as): Good Books. See S 1145.
 0030 USA, VOA Washington DC (ca): Now Music USA (Top Ten).
 0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.
 0053 Netherlands, Radio (am): Media Network.

Saturdays

- 0005 UK, BBC London (south as): Words and Music. See S 2310.
 0007 Ukraine, R Ukraine Intl: The Week.
 0010 UK, BBC London (south as): Seven Days. Roundup of the week's news, plus sports highlights, finance and the weather.
 0014 Czech Rep, Radio Prague: Calling All Listeners.
 0025 UK, BBC London (south as): Words of Faith. See S 0025.
 0030 UK, BBC London (am): Seven Days. See A 0010.
 0030 UK, BBC London (as pac/south as): From the Weeklies. Review of the British weekly press.
 0030 USA, VOA Washington DC (ca): Country Music USA.
 0032 Russia, Voice of: This is Russia.
 0045 UK, BBC London (am/as pac/south as): Britain Today. See S 0045.

FREQUENCIES

0100-0200	Australia, Radio	13605pa 15510as	13755pa 17795pa	15365pa	15415as	0100-0200	Spain, R Exterior Espana	9540na			
0100-0200 vl	Australia, VL8A Alice Spg	2310do				0100-0200	Sri Lanka, Sri Lanka BC	15425as			
0100-0200 vl	Australia, VL8K Katherine	5025do				0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200 vl	Australia, VL8T Tent Crk	4910do				0100-0200	United Kingdom, BBC WS	5970sa	5975va	6175va	6195as
0100-0200 vl	Canada, CBC N Quebec Svc	9625do						7265sa	7325va	9410as	9560va
0100-0200	Canada, CFCX Montreal	6005do						9590va	9915va	11750sa	11955as
0100-0200	Canada, CFRX Toronto	6070do						15360as			
0100-0200	Canada, CFVP Calgary	6030do				0100-0200	USA, KAIJ Dallas TX	5810am	9815am		
0100-0200	Canada, CHNX Halifax	6130do				0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	Canada, CKZN St John's	6160do				0100-0200 twhf	USA, KVOH Los Angeles CA	9975am			
0100-0200	Canada, CKZU Vancouver	6160do				0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0159	Canada, R Canada Intl	6120am	9535am	9755am	11715am	0100-0200	USA, Monitor Radio Intl	7535na	9430am		
		13670am				0100-0200	USA, Voice of America	5995am	6130am	7115as	7205as
0100-0200	Costa Rica, RF Peace Intl	6205am	7385am					7405am	9455am	9635as	9775am
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na				11705as	11725as	13740am	15170as
0100-0127	Czech Rep, Radio Prague	6200na	7345na					15205as	15250as	17740as	17820as
0100-0200	Ecuador, HCJB	9745am	21455va			0100-0200	USA, WEWN Birmingham AL	5825eu	7425na		
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9640na	0100-0200	USA, WGTG McCaysville GA	9400am			
		11740na				0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0115	Ghana, Ghana Broad Corp	3366do	4915do			0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0130	Hungary, Radio Budapest	9840na	11870na			0100-0130	USA, WRMI/R Miami Intl	9955am			
0100-0200	Indonesia, Voice of	9525na				0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0128	Iran, VOIRI	6050na	9022na			0100-0200	USA, WWCR Nashville TN	3215am	5065am	5935am	7435am
0100-0110	Italy, RAI Intl	6005na	9675na	11800na				13845am			
0100-0200	Japan, NHK/Radio	5960na	11790as	11840as	11860as	0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
		11885as	11890as	11910as	17810as	0100-0120	Uzbekistan, R Tashkent	5975as	7190as		
0100-0200	Lebanon, Voice of Hope	9960eu				0100-0200	Vietnam, Voice of	5940na	7250na		
0100-0200 smtw	Malaysia, Radio	7295do				0103-0110	Croatia, Croatian Radio	5895eu	7165eu		
0100-0125	Netherlands, Radio	6020na	6165na	9845na		0104-0200	USA, WYFR Okeechobee FL	6065na			
0100-0200	New Zealand, R NZ Intl	15115pa				0115-0130 f	Greece, Voice of	7448na	9420na	9935na	
0100-0130 m	Norway, Radio Norway Intl	9560na				0130-0155	Austria, R Austria Intl	9655na			
0100-0200 vl	Papua New Guinea, NBC	9675do				0130-0150	Greece, Voice of	7448na	9420na	9935na	
0100-0200	Philippines, FEBC/R Intl	15450as				0130-0200	Netherlands, Radio	5905as	7305as	9860as	11655as
0100-0200	Russia, Voice of Russia WS	7070na	7240na	9620na	12010na	0130-0200	Sweden, Radio	7290am	9435am		
		12050na	13665na	15180na	15580na	0138-0155 1&3rd m	Denmark, R Denmark Intl	7465am	9560am		
0100-0130	Slovakia, R Slovakia Intl	5930na	7300na	9440na		0140-0200	Vatican State, Vatican R	5980as	7335as		
						0145-0200	Albania, R Tirana Intl	6140na	7160na		

SELECTED PROGRAMS

Sundays

- 0102 Slovakia, R Slovakia Intl: Slovakia Today (T-S).
 0104 Czech Rep, Radio Prague: Live in Prague.
 0109 Ecuador, HCJB Quito (am): HCJB DX Partyline.
 0110 USA, VOA Washington DC (am/ca/as): On the Line.
 0115 Switzerland, Swiss Radio Intl: Capital Letters (2/4).
 0124 Spain, R Exterior de Espana: Distance Unknown.
 0130 Australia, Radio: The Europeans.
 0130 UK, BBC London (af/am/eu): For and Against. NEW! A series of studio debates about negotiating with terrorists, freedom of the Internet, and other political issues.
 0130 USA, VOA Washington DC (am/ca): Press Conference USA.
 0135 UK, BBC London (as pac/south as): Sports Roundup. The latest sports news.
 0137 Austria, R Austria Intl: Postbox.
 0145 UK, BBC London (as pac/south as): Letter from America. See S 0030.
 0145 USA, WRNO New Orleans LA: Jazz.

Mondays

- 0100 Norway, Radio Norway Intl: Norway Now.
 0107 Slovakia, R Slovakia Intl: Listeners' Tribune (biweekly).
 0108 Germany, Deutsche Welle: Mailbag.
 0110 USA, VOA Washington DC (am/ca): New Horizons.
 0118 Germany, Deutsche Welle: Living in Germany.
 0120 Australia, Radio: Network Asia.
 0125 Japan, Radio: Media Roundup.
 0130 UK, BBC London (am): Seeing Stars (1). See S 0430.
 0130 UK, BBC London (am): Short Story. See S 0430.
 0131 Canada, RCI Montreal: The Mailbag.
 0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
 0145 UK, BBC London (am): On the Move. See S 0445.
 0145 UK, BBC London (as pac/south as): The Farming World. See S 1445.

Tuesdays

- 0100 USA, WWCR #4 Nashville TN: The Kurt Saxon Show (live).
 0110 USA, VOA Washington DC (am): Report to the Americas.
 0110 USA, VOA Washington DC (ca): Report to the Americas (T-A).
 0111 Czech Rep, Radio Prague: Magazine '96.
 0111 Russia, Voice of: Commonwealth Update (T-A).

- 0130 UK, BBC London (am): Outlook. See M 1405.
 0130 UK, BBC London (as pac): Development '96. See S 0615.
 0132 Germany, Deutsche Welle: German Tribune.
 0132 Russia, Voice of: Folk Box.
 0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
 0145 UK, BBC London (south as): Development '96. See S 0615.
 0155 UK, BBC London (am): Words of Faith. See S 0025.

Wednesdays

- 0111 Canada, RCI Montreal: Spectrum.
 0130 Ecuador, HCJB Quito (am): El Mundo Futuro.
 0130 UK, BBC London (am): Outlook. See M 1405.
 0133 Germany, Deutsche Welle: Come to Germany.
 0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
 0145 UK, BBC London (as pac/south as): Health Matters. See M 0445.
 0155 UK, BBC London (am): Words of Faith. See S 0025.

Thursdays

- 0100 USA, WWCR #4 Nashville TN: The Kurt Saxon Show (live).
 0107 Slovakia, R Slovakia Intl: Front Page Daily Review.
 0130 Ecuador, HCJB Quito (am): Ham Radio Today.
 0130 UK, BBC London (am): Outlook. See M 1405.
 0132 Russia, Voice of: The Jazz Show.
 0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
 0145 UK, BBC London (as pac/south as): From Our Own Correspondent. See S 0330.
 0155 UK, BBC London (am): Words of Faith. See S 0025.

Fridays

- 0115 Slovakia, R Slovakia Intl: Science Feature.
 0130 UK, BBC London (am): Outlook. See M 1405.
 0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
 0145 UK, BBC London (as pac/south as): Education. The World of Computers. See M 1230.
 0155 UK, BBC London (am): Words of Faith. See S 0025.

Saturdays

- 0100 USA, WWCR #4 Nashville TN: The Kurt Saxon Show (live).
 0114 Czech Rep, Radio Prague: Calling All Listeners.

- 0120 Slovakia, R Slovakia Intl: Slovak Kitchen (biweekly).
 0125 Japan, Radio: Music and Book Beat.
 0130 Austria, R Austria Intl: Report from Austria.
 0130 Ecuador, HCJB Quito (am): Musica del Ecuador.
 0130 UK, BBC London (am): Outlook. See M 1405.
 0130 USA, VOA Washington DC (am/ca): Press Conference USA.
 0131 Germany, Deutsche Welle: Through German Eyes.
 0132 Russia, Voice of: The Jazz Show.
 0135 UK, BBC London (as pac/south as): Sports Roundup. See S 0135.
 0145 UK, BBC London (as pac/south as): Global Concerns. See M 1230.
 0154 Radio Netherlands: Documentary. Living on the Land — Part 2 (3 Aug). See F 2354.
 0154 Radio Netherlands: Documentary. Living on the Land — Part 3 (10th). See W 1154.
 0154 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (17th). A three part series. David Swalling traces the history of the 17th century Dutch colony New Netherland.
 0154 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (24th). See F 1454.
 0154 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (1 Sep). See F 2354.
 0155 UK, BBC London (am): Words of Faith. See S 0025.

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FREQUENCIES

0200-0300 twfha	Argentina, RAE	11710am				0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
0200-0300	Australia, Radio	13755pa	15240pa	15365pa	17715as			11825as	15345as		
		17750as	17795pa			0200-0300	United Kingdom, BBC WS	5970sa	5975va	6175va	7235va
0200-0300 vl	Australia, VL8A Alice Spg	2310do						9410na	9560na	9590na	9605as
0200-0300 vl	Australia, VL8K Katherine	5025do						9915sa	15360as		
0200-0300 vl	Australia, VL8T Tent Crk	4910do				0200-0300	USA, KAIJ Dallas TX	5810am	9815am		
0200-0300	Canada, CBC N Quebec Svc	9625do				0200-0300	USA, KTNB Salt Lk City UT	7510am			
0200-0300	Canada, CFCX Montreal	6005do				0200-0300	USA, KVOH Los Angeles CA	9975am			
0200-0300	Canada, CFRX Toronto	6070do				0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	Canada, CFVP Calgary	6030do				0200-0300	USA, Monitor Radio Intl	5850na	9430am		
0200-0300	Canada, CHNX Halifax	6130do				0200-0300	USA, Voice of America	7115as	7205as	7651as	9635as
0200-0300	Canada, CKZN St John's	6160do						11705as	11725as	15170as	15250as
0200-0300	Canada, CKZU Vancouver	6160do						17740as	17820as		
0200-0259	Canada, R Canada Intl	6120ca	9535ca	9755na	11715am	0200-0300	USA, WEWN Birmingham AL	5825eu	7425na	11775na	
		13670am				0200-0300	USA, WGTG McCaysville GA	9400am			
0200-0300	Costa Rica, RF Peace Intl	6205am	7385am			0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na		0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300	Ecuador, HCJB	9745am	21455va			0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300	Egypt, Radio Cairo	9475na				0200-0300	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0200-0250	Germany, Deutsche Welle	7285as	9640as	9690as	11545as	0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
		11945as	11965as	12045as		0200-0300	Vietnam, Voice of	5940na	7250as		
		4885do	4935do	6150do		0203-0210	Croatia, Croatian Radio	5895eu	7165eu		
0200-0300 vl	Kenya, Kenya Broadc Corp	7295do				0215-0225	Nepal, Radio	7165do			
0200-0300 smtwh	Malaysia, Radio	5905as	7305as			0230-0300	Albania, R Tirana Intl	6140na	7160na		
0200-0300	Netherlands, Radio	9860na	11655na			0230-0259	Austria, R Austria Intl	9655na	9870ca	13730sa	
0200-0225	Netherlands, Radio	15115pa				0230-0300	Hungary, Radio Budapest	9840na	11870na		
0200-0300	New Zealand, R NZ Intl	9675do				0230-0300	Pakistan, Radio	7290as	15120as	15485as	17705as
0200-0300 vl	Papua New Guinea, NBC	5990na	6155na	7105na	9510na	0230-0245		17725as	17865me	21580me	
0200-0300	Romania, R Romania Intl	9570na	11940na			0230-0300	Philippines, R Pilipinas	17760me			
		7070na	7240na	9620na	12010na	0230-0300	Sweden, Radio	6090na			
0200-0300	Russia, Voice of Russia WS	12050na	13645na	13665na	15180na	0238-0255 1&3rd m	Denmark, R Denmark Intl	7465am	9560am		
		15580na				0245-0300	India, All India Radio	3945do	6045do	7110do	11830do
0200-0300	Slovakia, Adv World Radio	11610as						15135do			
0200-0300	South Korea, R Korea Intl	7275am	11725am	11810am	15575am	0250-0300	Vatican State, Vatican R	6095na	7305na	9605na	
0200-0300	Sri Lanka, Sri Lanka BC	15425as				0250-0300	Zambia, ZNBC Radio 2	6165do			

SELECTED PROGRAMS

Sundays

- 0200 USA, WRNO New Orleans LA: New Orleans Jazz Club.
 0200 USA, WWCR #3&4 Nashville TN: Spectrum (WWCR) (live).
 0210 Australia, Radio: Charting Australia.
 0210 Romania, Radio Romania Intl: The Week.
 0216 Germany, Deutsche Welle: Mailbag Asia.
 0217 Romania, Radio Romania Intl: World of Culture.
 0228 Romania, Radio Romania Intl: Radio Pictures.
 0230 Costa Rica, R for Peace Intl: RFPI's Mailbag.
 0230 UK, BBC London (af/am/eu): Music Review. News and views from the world of music.
 0230 UK, BBC London (as pac): In Praise of God. Weekly programme of worship and meditation.
 0230 UK, BBC London (south as): In Praise of God. See S 0230.
 0235 Taiwan, Voice of Free China: Mailbag Time.
 0237 Austria, R Austria Intl: Postbox.
 0243 Romania, Radio Romania Intl: Bucharest Along the Centuries.
 0247 Russia, Voice of: You Write to Moscow.
 0249 Romania, Radio Romania Intl: Radio Romania DX Mailbag.

Mondays

- 0200 USA, WHRI Noblesville IN (Angel 2): DXing with Cumbre.
 0211 Russia, Voice of: Moscow Mailbag.
 0215 Taiwan, Voice of Free China: Jade Bells and Bamboo Pipes.
 0230 UK, BBC London (af/am/as pac/eu/south as): Variable Feature. See S 1130.
 0231 Canada, RCI Montreal: Global Village.
 0232 Russia, Voice of: Timelines.
 0243 Albania, Radio Tirana: Music at Your Request.

Tuesdays

- 0205 USA, WWCR #3 Nashville TN: Radio Free America (live).
 0205 USA, WWCR #4 Nashville TN: The John Bryant Show (live).
 0206 USA, WHRI Noblesville IN (Angel 2): For the People (repeat).
 0211 Russia, Voice of: Newmarket.
 0230 UK, BBC London (af/am/eu): Meridian. See S 0630.
 0230 UK, BBC London (as pac/south as): Youth. Pop Science. See T 1530.
 0236 Costa Rica, R for Peace Intl: Hightower Radio.
 0236 Taiwan, Voice of Free China: Main Roads and Byways.
 0240 Costa Rica, R for Peace Intl: Earth and Sky.
 0248 Portugal, Radio Portugal Intl: Visitors' Notebook.

Wednesdays

- 0200 Costa Rica, R for Peace Intl: The Far Right Radio Review.
 0200 USA, WWCR #1 Nashville TN: Truth House.
 0205 USA, WWCR #3 Nashville TN: Radio Free America (live).

- 0205 USA, WWCR #4 Nashville TN: The John Bryant Show (live).
 0211 Russia, Voice of: Science and Engineering in the CIS.
 0215 Romania, Radio Romania Intl: Business Club.
 0215 Taiwan, Voice of Free China: Music Box.
 0226 Romania, Radio Romania Intl: Romanian Anglicists.
 0228 USA, WEWN Birmingham AL: A Homily for Today.
 0230 UK, BBC London (af/am/eu): Meridian On Screen. See T 1615.
 0230 UK, BBC London (as pac/south as): Meridian. See S 0630.
 0236 Costa Rica, R for Peace Intl: Hightower Radio.
 0236 Romania, Radio Romania Intl: Youth Club.
 0240 Costa Rica, R for Peace Intl: Earth and Sky.
 0243 Albania, Radio Tirana: PO Box Radio Tirana.
 0246 Sweden, Radio: MediaScan (1/3).

Thursdays

- 0200 Ecuador, HCJB Quito (am): The Latest Catch.
 0205 USA, WWCR #3 Nashville TN: Radio Free America (live).
 0211 Russia, Voice of: Moscow Mailbag.
 0230 UK, BBC London (af/am/eu): Meridian. See S 0630.
 0230 UK, BBC London (as pac/south as): Assignment. A weekly examination of a topical issue.
 0232 Taiwan, Voice of Free China: Journey into Chinese Culture.
 0235 Argentina, RAE: DX'ers Special.
 0236 Costa Rica, R for Peace Intl: Hightower Radio.
 0238 Costa Rica, R for Peace Intl: Report from the Desert.
 0254 Radio Netherlands: Documentary. Living on the Land — Part 2 (1 Aug). See F 2354.
 0254 Radio Netherlands: Documentary. Living on the Land — Part 3 (8th). See W 1154.
 0254 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (15th). See A 2354.
 0254 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (22nd). See F 1454.
 0254 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (29th). See F 2354.

Fridays

- 0205 USA, WWCR #3 Nashville TN: Radio Free America (live).
 0211 Russia, Voice of: Moscow Mailbag.
 0215 South Korea, Radio Korea Intl: Seoul Calling.
 0230 UK, BBC London (af/am/as pac/eu/south as): 30-Minute Drama. See W 1130.
 0232 Taiwan, Voice of Free China: New Record Time.
 0236 Costa Rica, R for Peace Intl: Hightower Radio.
 0240 Costa Rica, R for Peace Intl: Earth and Sky.

- 0246 Albania, Radio Tirana: Tourism in Albania.
 0246 Portugal, Radio Portugal Intl: Spotlight on Portugal.

Saturdays

- 0200 Ecuador, HCJB Quito (am): On-Line.
 0205 USA, WWCR #3 Nashville TN: Radio Free America (live).
 0210 Vietnam, Voice of Vietnam: Important Events in North Vietnam History.
 0211 Russia, Voice of: Moscow Mailbag.
 0212 Germany, Deutsche Welle: The Week in Germany.
 0217 Vietnam, Voice of Vietnam: Talk of the Week.
 0230 UK, BBC London (af/am/eu): Meridian. See S 0630.
 0230 UK, BBC London (as pac/south as): For and Against. See S 0130.
 0236 Costa Rica, R for Peace Intl: Hightower Radio.
 0237 Germany, Deutsche Welle: The Jazz Corner.
 0240 Albania, Radio Tirana: Horizon.
 0240 Costa Rica, R for Peace Intl: Earth and Sky.
 0240 Vietnam, Voice of Vietnam: Important Events in North Vietnam History.
 0247 Vietnam, Voice of Vietnam: Talk of the Week.

HAUSER'S HIGHLIGHTS

COSTA RICA: R FOR PEACE INT'L

Programming changes for 3rd quarter:

Every Living Thing, eco-hour with Traci Hickson, Sun 1800, Mon 0200, 0900.

Far Right Radio Review becomes part of *Global Community Forum* and expands to twice-weekly live call-ins, UT Wed & Fri 0200-0300; Wed repeats Sat 2000, Sun 0400, 1100, and Fri repeats Sun 2200, Mon 0600.

Jean Parker's *Disability Radio Worldwide* gets additional airing, now Mon 1900, Tue 0300, 1000, as well as Sat 2200, Sun 0600. No changes to *World of Radio* (RFPI)

FREQUENCIES

0300-0400	Australia, Radio	13605pa	13755pa	15240pa	15365pa	0300-0330	United Kingdom, BBC WS	5970sa	6135af	7235va	7325sa
		15415as	15510as	17750pa	17795pa			15360as			
0300-0400 vl	Australia, VL8A Alice Spg	2310do				0300-0400	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
0300-0400 vl	Australia, VL8K Katherine	5025do						6175va	6190af	6195eu	9410na
0300-0400 vl	Australia, VL8T Tent Crk	4910do						9600af	9605as	9895va	12095af
0300-0400 vl	Canada, CBC N Quebec Svc	9625do						15310as			
0300-0400	Canada, CFCX Montreal	6005do				0300-0400	USA, KAIJ Dallas TX	5810am	9815am		
0300-0400	Canada, CFRX Toronto	6070do				0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	Canada, CFVP Calgary	6030do				0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	Canada, CHNX Halifax	6130do				0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	Canada, CKZN St John's	6160do				0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	Canada, CKZU Vancouver	6160do				0300-0400	USA, Voice of America	6035af	6080af	6115af	7105af
0300-0400	China, China Radio Intl	9690na	9710na	11760na				7280af	7340af	7405af	7415af
0300-0400 vl	Costa Rica, Faro del Carib	5055do						9575af	9885af		
0300-0400	Costa Rica, RF Peace Intl	6205am	7385am			0300-0400	USA, WEWN Birmingham AL	5825eu	7425na		
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na		0300-0400	USA, WGTG McCaysville GA	9400am			
0300-0327	Czech Rep, Radio Prague	5930na	7345na			0300-0400	USA, WHRI Noblesville IN	5745am	7315am		
0300-0400	Ecuador, HCJB	9745am	21455va			0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0330	Egypt, Radio Cairo	9475na				0300-0400	USA, WMLK Bethel PA	9465eu			
0300-0350	Germany, Deutsche Welle	6085na	6185na	9535na	9615na	0300-0400	USA, WRNO New Orleans LA	7395am			
		9640na				0300-0400	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0300-0400	Guatemala, Radio Cultural	3300do				0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0400	Japan, NHK/Radio	11790na	11840as	15230na	17810as	0300-0315	Vatican State, Vatican R	6095na	7305na	9605na	
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0300-0400 mtwhfa	Zambia, ZNBC Radio 2	6165do			
0300-0330 vl	Mexico, Radio Mexico Intl	9705na				0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do			
0300-0325	Netherlands, Radio	5905as	7305as	9860as	11655as	0303-0310	Croatia, Croatian Radio	5895eu	7165eu		
0300-0400	New Zealand, R NZ Intl	15115pa				0315-0330 s	Greece, Voice of	7448na	9420na	9935na	
0300-0400 vl	Papua New Guinea, NBC	9675do				0320-0350	Vatican State, Vatican R	7360af	9660af		
0300-0330	Philippines, R Pilipinas	17760me	17865me	21580me		0330-0357	Czech Rep, Radio Prague	9480as			
0300-0400	Russia, Voice of Russia WS	7230na	9620na	12010na	12050na	0330-0355 mtwhf	Moldova, R Moldova Intl	7520na			
		13645na	13665na	15180na	15580na	0330-0400 twhf	Portugal, R Portugal Intl	6095am	9570am		
0300-0400	S Africa, Channel Africa	3220af	5955af			0330-0400	Slovakia, Adv World Radio	9465af			
0300-0400	Sri Lanka, Sri Lanka BC	15425as				0330-0400	Sweden, Radio	7115na			
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as	0330-0353	UAE, Radio Dubai	13675na	15395eu	21605na	
		15345as				0330-0400	United Kingdom, BBC WS	9610af	11730af	11955as	15280as
0300-0330	Thailand, Radio	15370na				0335-0355 vl	India, All India Radio	7110do	11830do	15135do	
0300-0350	Turkey, Voice of	9655eu	9685eu			0338-0355 1&3rd m	Denmark, R Denmark Intl	7165am	7465am	9565am	
0300-0315 mtwhf	Uganda, Radio	3340do				0340-0350	Greece, Voice of	7448na	9420na	9935na	
0300-0400	Ukraine, R Ukraine Intl	7150na	9550na			0345-0400 irreg	Burundi, Radio Nationale	6140do			
						0345-0400 as	Uganda, Radio	3340do			

SELECTED PROGRAMS

Sundays

- 0304 Czech Rep, Radio Prague: Live in Prague.
0305 UK, BBC London (af/am/as pac/eu/south as): Atlanta Live/Olympic Sportsworld (4th). Game highlights. (am): World Business Review. A look back at the previous week's business and a preview of upcoming events; (as pac): Sports Roundup. See S 0135.
0310 Japan, Radio: Hello from Tokyo.
0315 UK, BBC London (af/am/eu/south as): Sports Roundup. See S 0135.
0316 Ukraine, R Ukraine Intl: Hello from Kiev.
0330 Australia, Radio: At Your Request.
0330 UK, BBC London (am/as pac/south as): From Our Own Correspondent. Comment on the background to the news; (eu): Fourth Estate. John Eldinow and team review European press.
0335 UK, BBC London (af): Postmark Africa. Expert answers to any question under the sun.
0345 UK, BBC London (eu/am/as pac/south as): Write On. Air your views about World Service; write to PO Box 76, Bush House, Strand, London WC2B 4PH.
0355 UK, BBC London (eu): Pop Short. A five-minute popular music program.

Mondays

- 0300 USA, WWCR #3 Nashville TN: The Extraordinary Science Radio Hour.
0305 UK, BBC London (af/am/as pac/eu/south as): Atlanta Live/Olympic Sportsworld (5th). See S 0305; (am): World Business Brief. See S 1205.
0306 New Zealand, Radio NZ Intl: In Touch with New Zealand.
0308 Germany, Deutsche Welle: Mailbag.
0315 Japan, Radio: Radio Japan Magazine Hour (M-F).
0315 Taiwan, Voice of Free China: The Adventures of Taiwan.
0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.
0319 Germany, Deutsche Welle: Living in Germany.
0319 Ukraine, R Ukraine Intl: Music from Ukraine.
0320 China, China Radio Intl: China Snapshots.
0330 UK, BBC London (af): Network Africa. Breakfast show of news, sport, personalities, music, and listener's comments; (am): Brain of Britain. Panel quiz show; (as pac/south as): Off the Shelf. Daily readings from the best of world literature; (eu): Europe Today. See S 1600; (eu): Jazz for the Asking (Alternative). See S 0630.
0335 Taiwan, Voice of Free China: Mailbag Time.

- 0345 China, China Radio Intl: Listeners' Letterbox.
0345 UK, BBC London (as pac): Country Style. See S 0010.
0345 UK, BBC London (south as): Variable Feature. See S 1130.

Tuesdays

- 0300 Ukraine, R Ukraine Intl: Ukraine Today (T-A).
0305 UK, BBC London (am): World Business Report. See M 1205.
0305 USA, WWCR #3 Nashville TN: Radio Free America (live) (T-A).
0305 USA, WWCR #4 Nashville TN: The John Bryant Show (live) (T-A).
0315 Taiwan, Voice of Free China: Jade Bells and Bamboo Pipes.
0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.
0330 UK, BBC London (af): Network Africa. See M 0330; (am): The World Today. See M 1645; (as pac/south as): Off the Shelf. See M 0330; (eu): Europe Today. See S 1600; (eu): John Peel (Alternative). See M 1330.
0332 Russia, Voice of: Our Treasure Chest.
0345 China, China Radio Intl: Idioms and Their Stories.
0345 UK, BBC London (am): Off the Shelf. See M 0330; (as pac/south as): Country Style. See S 0010.

Wednesdays

- 0305 UK, BBC London (am): World Business Report. See M 1205.
0315 Taiwan, Voice of Free China: Kaleidoscope.
0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.
0330 Costa Rica, R for Peace Intl: RFPI's Mailbag.
0330 UK, BBC London (af): Network Africa. See M 0330; (am): The World Today. See M 1645; (as pac/south as): Off the Shelf. See M 0330; (eu): Youth. Pop Science. (Alternative). See T 1530; (eu): Europe Today. See S 1600.
0332 Russia, Voice of: Our Treasure Chest.
0335 Czech Rep, Radio Prague: Current Affairs.
0336 Taiwan, Voice of Free China: Main Roads and Byways.
0345 China, China Radio Intl: Listeners' Letterbox.
0345 Portugal, Radio Portugal Intl: Musical Kaleidoscope.
0345 UK, BBC London (am): Off the Shelf. See M 0330; (as pac/south as): Youth. Your Questions of Faith. See T 1145.

Thursdays

- 0305 UK, BBC London (af/am/as pac/eu/south as): Atlanta Live/Olympic Sportsworld (1st). See S 0305.
0305 UK, BBC London (am): World Business Report. See M 1205.
0315 Taiwan, Voice of Free China: Music Box.

- 0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.
0330 UK, BBC London (af): Network Africa. See M 0330; (am): The World Today. See M 1645; (as pac/south as): Off the Shelf. See M 0330; (eu): Europe Today. See S 1600; (eu): New Ideas (Alternative). See S 2330.
0345 UK, BBC London (am): Off the Shelf. See M 0330; (as pac/south as): Folk Routes. See S 0330.
0350 UK, BBC London (eu): Variable Feature (Alternative). See S 1130.

Fridays

- 0305 UK, BBC London (af/am/as pac/eu/south as): Atlanta Live/Olympic Sportsworld (6th). See S 0305.
0305 UK, BBC London (am): World Business Report. See M 1205.
0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.
0330 UK, BBC London (af): Network Africa. See M 0330; (am): The World Today. See M 1645; (as pac/south as): Off the Shelf. See M 0330; (eu): Europe Today. See S 1600; (eu): Focus on Faith (Alternative). Alison Hilliard talks to church leaders about their hopes for the future.
0333 Germany, Deutsche Welle: Science and Technology.
0345 UK, BBC London (am): Off the Shelf. See M 0330; (as pac/south as): On the Move. See S 0445.

Saturdays

- 0305 UK, BBC London (af/am/as pac/eu/south as): Atlanta Live/Olympic Sportsworld (7th). See S 0305.
0305 UK, BBC London (am): World Business Report. See M 1205.
0310 Japan, Radio: This Week.
0314 Czech Rep, Radio Prague: Calling All Listeners.
0315 UK, BBC London (af/am/as pac/eu/south as): Sports Roundup. See S 0135.
0330 UK, BBC London (am): The World Today. See M 1645.
0330 UK, BBC London (as pac/eu/south as): The Vintage Chart Show. See W 1215.
0331 UK, BBC London (af): African Quiz (1). A monthly test of the listener's knowledge of Africa; (af): This Week and Africa. A roundup of the week's political developments across the continent.
0332 Germany, Deutsche Welle: Through German Eyes.
0332 Taiwan, Voice of Free China: New Record Time.
0334 China, China Radio Intl: Life in China.
0344 Czech Rep, Radio Prague: Calling All Listeners.
0345 UK, BBC London (am): Off the Shelf. See M 0330.

FREQUENCIES

0400-0500	Australia, Radio	11880pa	13605as	15240pa	15365pa	0400-0430	Tanzania, Radio	5050af			
0400-0500 vl	Australia, VL8A Alice Spg	15415pa	17750as	17795pa		0400-0415	Uganda, Radio	5026do			
0400-0500 vl	Australia, VL8K Katherine	2310do				0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975af	6005af
0400-0500 vl	Australia, VL8T Tent Crk	4910do						6175va	6180eu	6195eu	7160af
0400-0500	Bulgaria, Radio	9700na	11720na					9410af	9500af	11760va	12095af
0400-0500 vl	Canada, CBC N Quebec Svc	9625do				0400-0500	USA, KAIJ Dallas TX	5810am	9815am		
0400-0500	Canada, CFCX Montreal	6005do				0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	Canada, CFRX Toronto	6070do				0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	Canada, CFVP Calgary	6030do				0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	Canada, CHNX Halifax	6130do				0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	Canada, CKZN St John's	6160do				0400-0500	USA, Voice of America	6035af		7170va	7265af
0400-0500	Canada, CKZU Vancouver	6160do						7280af	7405af	9575af	11965va
0400-0430	Canada, R Canada Intl	11835me	11905me	15275me		0400-0430	USA, Voice of America	6145af	7340af		
0400-0500	China, China Radio Intl	9560na	9730na			0400-0500	USA, WEWN Birmingham AL	5825eu	7425na		
0400-0500	Costa Rica, RF Peace Intl	6205am	7385am			0400-0500	USA, WHRI Noblesville IN	5760am	7315am		
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na	0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500	Ecuador, HCJB	9745am	21455va			0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0450	Germany, Deutsche Welle	5990af	6015af	6185af	7150af	0400-0500	USA, WRNO New Orleans LA	7395am			
		7225af	9565af	11765af		0400-0500	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0400-0500 twtfla	Guatemala, Radio Cultural	3300do				0400-0500	USA, WYFR Okeechobee FL	9985af			
0400-0415	Israel, Kol Israel	7465na	9435na	17545au		0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		0400-0500	Zambia, Christian Voice	3330af			
0400-0500	Lebanon, Voice of Hope	9960eu				0400-0410	Zambia, ZNBC Radio 2	6165do			
0400-0430 vl/m-a	Mexico, Radio Mexico Intl	9705na				0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0400-0458	New Zealand, R NZ Intl	15115pa				0403-0410	Croatia, Croatian Radio	5895eu	7165eu		
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as		0425-0440	Italy, RAI Intl	5975eu	7275eu		
0400-0430 m	Norway, Radio Norway Intl	7520na				0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0400-0500 vl	Papua New Guinea, NBC	9675do				0430-0500	Australia, Radio	15510pa			
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0430-0500	Australia, Defense Forces R	13525as			
		11940na				0430-0455 mtwhf	Moldova, R Moldova Intl	7520eu			
0400-0500	Russia, Voice of Russia WS	7230na	9620na	12010na	12050na	0430-0500	Netherlands, Radio	6165na	9590na		
		13645na	13665na	15180na	15580na	0430-0500	Serbia, Radio Yugoslavia	9580na	11870na		
0400-0455	S Africa, Channel Africa	3220af	5955af			0430-0500	Swaziland, Trans World R	3200af	4775af	6070af	
0400-0427	S Africa, Trans World R	7165af				0430-0500	Switzerland, Swiss R Intl	9905na			
0400-0430	Slovakia, Adv World Radio	11600af				0430-0500	United Kingdom, BBC WS	7150eu	15420af		
0400-0430	Sri Lanka, Sri Lanka BC	15425as				0430-0500	USA, Voice of America	5970af			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na		0438-0455 1&3rd s	Denmark, R Denmark Intl	7520na	9565na	13805na	
						0459-0500 mtwhf	New Zealand, R NZ Intl	9570pa			

SELECTED PROGRAMS

Sundays

- 0400 Costa Rica, R for Peace Intl: The Far Right Radio Review.
 0410 Australia, Radio: Feedback.
 0415 Switzerland, Swiss Radio Intl: Capital Letters (2/4).
 0415 Switzerland, Swiss Radio Intl: The Name Game (1/3/5).
 0430 Switzerland, Swiss Radio Intl: Network Switzerland (S-F).
 0430 UK, BBC London (am): Science in Action. The latest in science and technology.
 0430 UK, BBC London (as pac/south as): Seeing Stars (1). A discussion of astronomical observations and special events for the near future.
 0430 UK, BBC London (as pac/south as): Short Story. Fifteen-minute dramas written by listeners from around the world.
 0430 UK, BBC London (eu): Seeing Stars (1) (Alternative). See S 0430.
 0430 UK, BBC London (eu): Short Story (Alternative). See S 0430.
 0430 UK, BBC London (eu): Weekend. European magazine program co-produced by European broadcasters.
 0432 Russia, Voice of: Moscow Yesterday and Today.
 0435 UK, BBC London (af): The Art House. No information available.
 0445 UK, BBC London (as pac/south as): Record News. Focus on the most interesting new releases of classical recordings.
 0445 UK, BBC London (eu): On the Move. A weekly program about travel and transport with Malcolm Billings.

Mondays

- 0405 USA, WWCR #3 Nashville TN: Ham Radio and More.
 0430 New Zealand, Radio NZ Intl: RNZI Mailbox (biweekly).
 0430 UK, BBC London (af): Network Africa. See M 0330.
 0430 UK, BBC London (am): The Learning World. See S 1130.
 0430 UK, BBC London (as pac/south as): Composer of the Month. In depth looks at classical composers and their music. A different composer is featured each month.
 0430 UK, BBC London (eu): Europe Today. See S 1600.
 0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
 0432 Russia, Voice of: The Jazz Show.
 0445 Switzerland, Swiss Radio Intl: Capital Letters (2/4).

- 0445 UK, BBC London (am): Health Matters. Keeps track of new developments in the world of medical science, as well as ways of keeping fit.
 0445 UK, BBC London (eu): Country Style (Alternative). See S 0010.

Tuesdays

- 0430 UK, BBC London (af): Network Africa. See M 0330.
 0430 UK, BBC London (am): Outlook. See M 1405.
 0430 UK, BBC London (as pac): Multitrack Hit-List. See M 1615.
 0430 UK, BBC London (eu): Europe Today. See S 1600.
 0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
 0430 UK, BBC London (south as): Multitrack Hit-List. See M 1615.
 0445 UK, BBC London (eu): Health Matters (Alternative). See M 0445.
 0455 UK, BBC London (am): Press Review. A look at what the papers say.

Wednesdays

- 0430 UK, BBC London (af): Network Africa. See M 0330.
 0430 UK, BBC London (am): Outlook. See M 1405.
 0430 UK, BBC London (as pac/south as): Education. Legal Rights, Legal Wrongs. See M 1215.
 0430 UK, BBC London (eu): Europe Today. See S 1600.
 0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
 0445 UK, BBC London (as pac/south as): Education. The World of Computers. See M 1230.
 0445 UK, BBC London (eu): The Farming World (Alternative). See S 1445.
 0455 UK, BBC London (am): Press Review. See T 0455.

Thursdays

- 0430 UK, BBC London (af): Network Africa. See M 0330.
 0430 UK, BBC London (am): Outlook. See M 1405.
 0430 UK, BBC London (as pac/south as): Multitrack X-Press. See W 1615.
 0430 UK, BBC London (eu): Europe Today. See S 1600.
 0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.

- 0432 Russia, Voice of: Folk Box.
 0445 UK, BBC London (eu): From Our Own Correspondent (Alternative). See S 0330.
 0454 Radio Netherlands: Documentary. Living on the Land — Part 2 (1 Aug). See F 2354.
 0454 Radio Netherlands: Documentary. Living on the Land — Part 3 (8th). See W 1154.
 0454 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (15th). See A 2354.
 0454 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (22nd). See F 1454.
 0454 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (29th). See F 2354.
 0455 UK, BBC London (am): Press Review. See T 0455.

Fridays

- 0400 Costa Rica, R for Peace Intl: Micro-Power Radio in the U.S..
 0430 UK, BBC London (af): Network Africa. See M 0330.
 0430 UK, BBC London (am): Outlook. See M 1405.
 0430 UK, BBC London (as pac/south as): Focus on Faith. See F 0330.
 0430 UK, BBC London (eu): Europe Today. See S 1600.
 0430 UK, BBC London (eu): Off the Shelf (Alternative). See M 0330.
 0445 UK, BBC London (eu): Folk Routes (Alternative). See S 0030.
 0455 UK, BBC London (am): Press Review. See T 0455.

Saturdays

- 0430 Switzerland, Swiss Radio Intl: Swiss Scene.
 0430 UK, BBC London (am): Outlook. See M 1405.
 0430 UK, BBC London (as pac/south as): Jazz Now and Then. See S 1230.
 0430 UK, BBC London (eu): Jazz Now and Then. See S 1230.
 0431 UK, BBC London (af): African Quiz (1). See A 0331.
 0431 UK, BBC London (af): This Week and Africa. See A 0331.
 0432 Russia, Voice of: Timelines.
 0445 UK, BBC London (as pac/eu/south as): Seven Days. See A 0010.
 0455 UK, BBC London (am): Press Review. See T 0455.

FREQUENCIES

0600-0700	Australia, Radio	9860pa 15240pa 15530as 2310do	11880pa 15365pa 17715as	12080pa 15415as 17880as	13605as 15510as	0600-0700	United Kingdom, BBC WS	3955eu 7145pa 9640af 12095as 15280as 15420af	5975va 7160af 9740as 15280as 15575va 9815am	6175eu 9410eu 11760eu 15310as 17640af	6195eu 9600af 11955as 15360va 17790as
0600-0700 vl	Australia, VL8A ALice Spg					0600-0700	USA, KAIJ Dallas TX	5810am			
0600-0700 vl	Australia, VL8K Katherine	5025do				0600-0700	USA, KTNB Salt Lk City UT	7510am			
0600-0700 vl	Australia, VL8T Tent Crk	4910do				0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0630	Australia, Defense Forces R	13525as				0600-0700	USA, KWHR Naalehu HI	17780as			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do				0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	Canada, CFCX Montreal	6005do				0600-0700	USA, Voice of America	5970af	6035af	6140af	7195af
0600-0700	Canada, CFRX Toronto	6070do						9630af	11805af	11950af	11965af
0600-0700	Canada, CFVP Calgary	6030do						12080af	15205af		
0600-0700	Canada, CHNX Halifax	6130do				0600-0630	USA, Voice of America	6080af	9435af		
0600-0700	Canada, CKZU Vancouver	6160do				0600-0700	USA, WEWN Birmingham AL	5825eu	7425na		
0600-0700	Costa Rica, RF Peace Intl	6205am	7385am	15050am		0600-0700	USA, WHRI Noblesville IN	5760am	7315am		
0600-0700	Cuba, Radio Havana	9820na	9830na			0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700	Ecuador, HCJB	9745am	21455am			0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0650	Germany, Deutsche Welle	11915af 17875af	13790af	15185af	15225af	0600-0700	USA, WRNO New Orleans LA	7395na			
0600-0615	Ghana, Ghana Broadc Corp	3366do	4915do			0600-0700	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0600-0700 vl	Italy, IRRS	3985va				0600-0700	USA, WYFR Okeechobee FL	5985eu	7355eu	9985af	
0600-0700 vl	Japan, NHK/Radio	11725as	11850au	17810as		0600-0645 vl/m-f	Vatican State, Vatican R	4005eu	5880eu	7250eu	9645eu
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do				15215me			
0600-0700 vl	Kiribati, Radio	9825do				0600-0700	Yemen, Yemeni Rep Radio	9780do			
0600-0700	Lebanon, Voice of Hope	9960eu				0600-0700	Zambia, Christian Voice	3330af			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au		0600-0605 mtwhf	Zambia, ZNBC Radio 1	7220do			
0600-0700	New Zealand, R NZ Intl	9570pa				0600-0630	Zambia, ZNBC Radio 2	6165do			
0600-0630	Nigeria, FRNC/Radio	3326do	4990do			0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0600-0700	North Korea, R Pyongyang	15180as	15230as			0603-0610	Croatia, Croatian Radio	5920eu	7165eu	9830eu	13830eu
0600-0630 s	Norway, Radio Norway Intl	7180au	7295af	9590au		0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0600-0700 vl	Papua New Guinea, NBC	9675do				0615-0630	Switzerland, Swiss R Intl	6165eu	9535eu		
0600-0640 vl	Romania, R Romania Intl	9550eu	9665eu	11815eu		0630-0655	Austria, R Austria Intl	6015na			
0600-0700	Russia, Voice of Russia WS	12010na 13665na 17665na	12040na 15470as 15560na	12050na 15580na	13645na 15580na	0630-0700	Belgium, R Vlaanderen Int	5985eu	9925au		
						0630-0700 as	USA, Voice of America	6080af			
0600-0700	S Africa, Trans World R	11730af				0630-0700	Vatican State, Vatican R	11625af	13765af	15570af	13805va
0600-0610	Sierra Leone, SLBS	3316do				0638-0655 1&3rd s	Denmark, R Denmark Intl	7180va	7295va	9590va	
0600-0630	Slovakia, Adv World Radio	13715af				0645-0655 as	Monaco, Trans World Radio	7115eu			
0600-0700	Slovakia, Adv World Radio	5905am				0645-0700	Romania, R Romania Intl	11740pa 17720pa	11840pa	15250pa	15270pa
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do					7115eu			
0600-0700	Swaziland, Trans World R	11730af				0655-0700 mtwhf	Monaco, Trans World Radio				
0600-0630	Switzerland, Swiss R Intl	9885af	11860af	13635af							

SELECTED PROGRAMS

Sundays

- 0600 UK, BBC London (am): Play of the Week (from 0530). See S 0530.
- 0605 USA, WWCR #1 Nashville TN: The Golden Age of Radio Theater.
- 0610 Australia, Radio: Feedback.
- 0610 USA, VOA Washington DC (af): VOA Sunday.
- 0611 Russia, Voice of: Moscow Mailbag.
- 0615 UK, BBC London (af/eu): Development '96. Aid and development issues.
- 0615 UK, BBC London (as pac/south as): Letter from America. See S 0030.
- 0630 Belgium, R Vlaanderen Intl: Brussels Calling (Daily).
- 0630 Ecuador, HCJB Quito (am): Musical Mailbag.
- 0630 UK, BBC London (am/eu): Jazz for the Asking. Record requests with Malcolm Laylock.
- 0630 UK, BBC London (as pac/south as): Meridian. One of the topical programs weekly about the world of the arts.
- 0631 UK, BBC London (af): African Perspective. A considered view of life and issues facing the African continent.
- 0640 Austria, R Austria Intl: Postbox.

Mondays

- 0600 Costa Rica, R for Peace Intl: The Far Right Radio Review.
- 0610 USA, VOA Washington DC (af): VOA Today (M-F).
- 0611 Australia, Radio: Pacific Beat (T-F).
- 0611 Russia, Voice of: Science and Engineering in the CIS.
- 0615 UK, BBC London (af): Sports Roundup. See S 0135.
- 0615 UK, BBC London (am): Variable Music Feature. See S 1430.
- 0615 UK, BBC London (as pac/south as): The Learning World. See S 1130.
- 0615 UK, BBC London (eu): Variable Feature. See S 1130.
- 0630 UK, BBC London (af): Network Africa. See M 0330.
- 0630 UK, BBC London (as pac/south as): Jazz for the Asking. See S 0630.
- 0630 UK, BBC London (eu): Andy Kershaw's World of Music. See S 1230.
- 0630 USA, WWCR #1 Nashville TN: Ken's Country Classics.
- 0632 Russia, Voice of: Russian by Radio.

- 0645 UK, BBC London (am): Variable Music Feature (19th, 26th). See S 1430.
- 0645 UK, BBC London (am): Variable Music Feature (5th, 12th). Music Through Stained Glass. See S 1430.

Tuesdays

- 0611 Russia, Voice of: Newmarket.
- 0615 UK, BBC London (af): Sports Roundup. See S 0135.
- 0615 UK, BBC London (am): The Greenfield Collection. See M 1515.
- 0615 UK, BBC London (as pac/eu/south as): The World Today. See M 1645.
- 0630 UK, BBC London (af): Network Africa. See M 0330.
- 0630 UK, BBC London (as pac/south as): Meridian. See S 0630.
- 0630 UK, BBC London (eu): Anything Goes. See S 0530.
- 0632 Russia, Voice of: This is Russia.

Wednesdays

- 0611 Russia, Voice of: Moscow Mailbag.
- 0615 UK, BBC London (af): Sports Roundup. See S 0135.
- 0615 UK, BBC London (am): John Peel. See M 1330.
- 0615 UK, BBC London (as pac/eu/south as): The World Today. See M 1645.
- 0630 UK, BBC London (af): Network Africa. See M 0330.
- 0630 UK, BBC London (as pac/south as): Meridian On Screen. See T 1615.
- 0630 UK, BBC London (eu): Megamix. See T 1615.
- 0632 Russia, Voice of: Moscow Yesterday and Today.
- 0645 UK, BBC London (am): Development '96. See S 0615.
- 0650 Belgium, R Vlaanderen Intl: Green Society.

Thursdays

- 0600 Ecuador, HCJB Quito (am): The Latest Catch.
- 0611 Russia, Voice of: Newmarket.
- 0615 UK, BBC London (af): Sports Roundup. See S 0135.
- 0615 UK, BBC London (am): Jazz Now and Then. See S 1230.
- 0615 UK, BBC London (as pac/eu/south as): The World Today. See M 1645.
- 0630 UK, BBC London (af): Network Africa. See M 0330.

- 0630 UK, BBC London (am/eu): Sports International. Live commentaries and interviews, features and discussions.
- 0630 UK, BBC London (as pac/south as): 30-Minute Drama. See W 1130.
- 0632 Russia, Voice of: This is Russia.

Fridays

- 0611 Russia, Voice of: Science and Engineering in the CIS.
- 0615 UK, BBC London (af): Sports Roundup. See S 0135.
- 0615 UK, BBC London (am): Short Story. See S 0430.
- 0615 UK, BBC London (as pac/eu/south as): The World Today. See M 1645.
- 0630 UK, BBC London (af): Network Africa. See M 0330.
- 0630 UK, BBC London (am): Education. Legal Rights, Legal Wrongs. See M 1215.
- 0630 UK, BBC London (as pac/south as): Variable Comedy/Quiz Feature. See S 1401.
- 0630 UK, BBC London (eu): Popular Music. Rock Salad. See W 1530.
- 0632 Russia, Voice of: Moscow Yesterday and Today.
- 0645 UK, BBC London (am): Education. The World of Computers. See M 1230.

Saturdays

- 0600 Ecuador, HCJB Quito (am): On-Line.
- 0610 USA, VOA Washington DC (af): VOA Saturday.
- 0611 Russia, Voice of: Science and Engineering in the CIS.
- 0615 UK, BBC London (af/as pac/eu/south as): The World Today. See M 1645.
- 0615 UK, BBC London (am): From the Weeklies. See A 0030.
- 0630 Austria, R Austria Intl: Report from Austria.
- 0630 Ecuador, HCJB Quito (am): On Track.
- 0630 UK, BBC London (am): Science in Action. See S 0430.
- 0630 UK, BBC London (as pac/south as): Meridian. See S 0630.
- 0630 UK, BBC London (eu): Fourth Estate. See S 0330.
- 0631 UK, BBC London (af): African Quiz (1). See A 0331.
- 0631 UK, BBC London (af): This Week and Africa. See A 0331.
- 0632 Russia, Voice of: This is Russia.
- 0645 UK, BBC London (eu): Global Concerns. See M 1230.

FREQUENCIES

0700-0800	Australia, Radio	9860pa	12080pa	15240pa	15365pa
		15415as	15510as	15530as	17715pa
		17880as			
0700-0730	Australia, Radio	11880as	13605as	15245as	
0700-0800 vl	Australia, VL8A Alice Spg	2310do			
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica, RF Peace Intl	6205am	7385am	15050am	
0700-0727	Czech Rep, Radio Prague	7345eu	9530eu		
0700-0800	Ecuador, HCJB	9445pa	11615eu	21455au	
0700-0800 as	Eqt Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0730 vl	Italy, IRRS	3985va			
0700-0800	Japan, NHK/Radio	7230eu	11725as	11740as	11850pa
		11920as	15165me	17810va	17815af
		21610as			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Voice of Hope	9960eu			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	9750as	15295au		
0700-0710	Malaysia, Voice of	6175as			
0700-0800	Monaco, Trans World Radio	7115eu			
0700-0715 mtwhf	New Zealand, R NZ Intl	9570pa			
0700-0758 as	New Zealand, R NZ Intl	9570pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0800 vl	Palau, KHBN/Voice of Hope	9965as			
0700-0745	Romania, R Romania Intl	11740pa	11840pa	15250pa	15270pa
		17720pa			
0700-0800	Russia, Voice of Russia WS	15470as	15560va	17570va	17665as
0700-0710	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	3955eu	6175eu	6190af	6195eu
		7145va	7325eu	9410eu	9600af
		9640va	9740as	11760as	11940af
		11955as	12095va	15070va	15280as
		15310as	15360va	15400va	15575me
		17790as	17830af	17885af	
	17640va				
0700-0730	United Kingdom, BBC WS	6180eu	11780eu		
0700-0715	United Kingdom, BBC WS	6005af	7160af		
0700-0800	USA, KAIJ Dallas TX	5810am	9815am		
0700-0800	USA, KTNB Salt Lk City UT	7510am			
0700-0800	USA, KVOH Los Angeles CA	9975am			
0700-0800	USA, KWHR Naalehu HI	9930as			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	7425na		
0700-0800	USA, WHRI Noblesville IN	5760am	7315am		
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	2390am	5065am	5935am	7435am
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985eu		
0700-0800	USA, WYFR Okeechobee FL	13695af			
0700-0800 vl	Vanuatu, Radio	3945do	7260do		
0700-0800	Zambia, Christian Voice	6065af			
0700-0800	Zambia, ZNBC Radio 2	6165do			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0703-0710 mtwhf	Croatia, Croatian Radio	5920eu	7165eu	9830eu	13830eu
0705-0800	Swaziland, Trans World R	5055af	9500af	9650af	
0710-0800 vl	Papua New Guinea, NBC	4890do			
0716-0800 mtwhf	New Zealand, R NZ Intl	6100pa			
0730-0800	Australia, Radio	9580pa	9710pa		
0730-0755	Austria, R Austria Intl	6155eu	13730eu	15410me	17870me
0730-0745 s	Greece, Voice of	7450eu	9425eu	11645au	
0730-0735	India, All India Radio	15185do			
0730-0800 vl	Italy, IRRS	7125va			
0730-0800	Netherlands, Radio	9700pa	9720au	11895pa	
0738-0755 1&3rd s	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7450eu	9425eu	11645au	
0755-0800	Guam, AWR/KTWR	15200as			
0758-0800 as	New Zealand, R NZ Intl	6100pa			

0800 UTC

0800-0900	Australia, Radio	6020pa	6080pa	9580pa	9710pa
		9860pa	15530as	17715pa	
0800-0900 vl	Australia, VL8A Alice Spg	2310do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0900 vl	Australia, VL8T Tent Crk	4910do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			

0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0830	Chile, Radio Esperanza	6090sa			
0800-0900	Costa Rica, RF Peace Intl	6205am	7385am		
0800-0900 s	Denmark, Radio ABC	7570eu			
0800-0830	Ecuador, HCJB	11615eu			
0800-0900	Ecuador, HCJB	9445pa	21455au		
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Indonesia, Voice of	9525as			
0800-0900 vl	Italy, IRRS	7125va			
0800-0900 mtwhf	Italy, IRRS	3985va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Voice of Hope	6280eu	9960me		
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0820 mtwhf	Monaco, Trans World Radio	7115eu			
0800-0805 a	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9700pa	9720au	11895pa	
0800-0900	New Zealand, R NZ Intl	6100pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 s	Norway, Radio Norway Intl	17860au			
0800-0850	Pakistan, Radio	15470eu	17900eu		
0800-0900 vl	Palau, KHBN/Voice of Hope	9730as	9955as	9965as	15140as
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia, Voice of Russia WS	5940va	9835va	11800pa	12025as
		15470as	15560pa	15580as	
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670eu		
0800-0900	United Kingdom, BBC WS	6190af	6195va	9410eu	9600af
		9740as	9805va	11760as	11940af
		11955as	15070af	15280as	15310as
		15400va	15575me	17640va	17790as
		17830af	17885af		
0800-0815	United Kingdom, BBC WS	3955eu	7145va	12095eu	
0800-0900	USA, KAIJ Dallas TX	5810am	9815am		
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTNB Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	9845pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	7425na		
0800-0900	USA, WHRI Noblesville IN	5760am	7315am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	2390am	5065am	5935am	7435am
0800-0830 vl	Vanuatu, Radio	3945do	7260do		
0800-0900	Zambia, Christian Voice	6065af			
0800-0805 mtwhf	Zambia, ZNBC Radio 2	6165do			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0803-0810 as	Croatia, Croatian Radio	5920eu			
0805-0835 mtwhf	Swaziland, Trans World R	4775af	7165eu	9830eu	13830eu
0815-0900 mtwhf	Nigeria, FRCN/Radio	3326do	4990do		
0830-0900 s	Armenia, Voice of	15270eu			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900	Georgia, Radio	11910me			
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900	Lithuania, Radio Vilnius	9710eu			
0830-0900	Netherlands, Radio	9720au	13700pa		
0830-0900	Slovakia, R Slovakia Intl	11990au	15460au	17550au	
0838-0855 1&3rd s	Denmark, R Denmark Intl	15220va	17855va		
0855-0900	Guam, TWR/KTWR	11830pa			



Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.

FREQUENCIES

0900-1000	Australia, Radio	5995as	7240as	9510as	9580pa
0900-1000 vl	Australia, VL8A Alice Spg	9860pa	13605as	21725as	
0900-1000 vl	Australia, VL8K Katherine	2310do			
0900-1000 vl	Australia, VL8T Tent Crk	2485do			
0900-0930 mtwhfa	Belgium, R Vlaanderen Int	4910do			
0900-1000	Canada, CFCX Montreal	6035eu	15545af	17595af	
0900-1000	Canada, CFRX Toronto	6005do			
0900-1000	Canada, CFVP Calgary	6070do			
0900-1000	Canada, CHNX Halifax	6030do			
0900-1000	Canada, CKZU Vancouver	6130do			
0900-1000	China, China Radio Intl	6160do			
0900-1000	Costa Rica, RF Peace Intl	11755pa	15440pa	17690au	
0900-0930	Czech Rep, Radio Prague	6205am	7385am		
0900-1000 s	Denmark, Radio ABC	15640me	17485af		
0900-1000	Ecuador, HCJB	7570eu			
0900-1000 as	Eqt Guinea, R East Africa	9445pa	21455au		
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	15186af			
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	6160as	9565af	12055as	15225af
0900-0915	Guam, TWR/KTWR	15410af	17800af	21600af	21680as
0900-1000	Guam, TWR/KTWR	3366do	4915do		
0900-1000 vl/as	Italy, IRRS	15200as			
0900-0930 mtwhf	Italy, IRRS	11830pa			
0900-1000	Japan, NHK/Radio	7125va			
0900-0930 vl	Kiribati, Radio	3985va			
0900-1000	Lebanon, Voice of Hope	9610as	11850au	15190as	
0900-1000	Malaysia, Radio	9825do			
0900-0925	Netherlands, Radio	6280eu	9960me		
0900-1000	New Zealand, R NZ Intl	7295do			
0900-1000 vl	Papua New Guinea, NBC	9720au	13700pa		
0900-1000	Russia, Voice of Russia WS	6100pa			
0900-0930	Switzerland, Swiss R Intl	4890do			
0900-1000	United Kingdom, BBC WS	7150va	9835pa	11800as	12025as
0900-0915	United Kingdom, BBC WS	15580as			
0900-1000	USA, KAIJ Dallas TX	9885pa	13685pa	17515pa	
0900-1000	USA, KTNB Salt Lk City UT	6190af	6195va	9410eu	9740as
0900-1000	USA, Monitor Radio Intl	11750as	11940af	12095eu	15070va
0900-1000	USA, WEWN Birmingham AL	15190sa	15280va	15400va	15575va
0900-1000	USA, WHRI Noblesville IN	17640va	17705eu	17830va	17885af
0900-1000	USA, WJCR Upton KY	6065as	7180as	9580as	11760as
0900-1000 smtwhf	USA, WMLK Bethel PA	11955as	15310as	15360as	17790as
0900-1000 as	USA, WVHA Greenbush ME	5810am	9815am		
0900-1000	USA, WWCR Nashville TN	7510am			
0900-1000 vl	Zambia, Christian Voice	7395sa	7535eu	9430as	13615au
0903-0910 mtwhf	Zimbabwe, Zimbabwe BC	5825eu	7425na		
0915-1000	Croatia, Croatian Radio	5760am	7315am		
0930-0955 mtwhfa	Ghana, Ghana Broadc Corp	7490na	13595na		
0930-1000	Austria, R Austria Intl	9465eu			
0930-1000	Canada, CKZN St John's	13825va			
0930-1000	Mongolia, R Ulan Bator	2390am	5065am	5935am	7435am
0930-1000	Netherlands, Radio	6065af			
0938-0955 1&3rd s	Denmark, R Denmark Intl	5975do	7165eu	9830eu	
		5920eu	7165eu	9830eu	
		6130do	7295do		
		6155eu	13730eu	15450as	17870au
		6160do			
		11850as	12085as		
		9720au	12065pa	13705pa	
		13800va	17855va		

1000 UTC

1000-1100	Australia, Radio	5995as	7240as	9510as	9580pa
1000-1100 vl	Australia, VL8A Alice Spg	9860pa	13605as	15170as	21725as
1000-1100 vl	Australia, VL8K Katherine	2310do			
1000-1100 vl	Australia, VL8T Tent Crk	2485do			
1000-1100 vl	Canada, CBC N Quebec Svc	4910do			
1000-1100	Canada, CFCX Montreal	9625do			
1000-1100	Canada, CFRX Toronto	6005do			
1000-1100	Canada, CFVP Calgary	6070do			
1000-1100	Canada, CHNX Halifax	6030do			
1000-1100	Canada, CKZN St John's	6130do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	6160do			
1000-1100	Costa Rica, RF Peace Intl	11755pa	15440pa	17690au	
1000-1100 s	Denmark, Radio ABC	6205am	7385am		
1000-1100	Ecuador, HCJB	7570eu			
1000-1100 as	Eqt Guinea, R East Africa	9445pa	21455au		
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Guam, AWR/KSDA	15186af			
1000-1100	India, All India Radio	9370as			
1000-1100	Iraq, Radio Iraq Intl	13700as	15050as	17387au	17890as
1000-1100 vl/as	Italy, IRRS	13680eu			
1000-1100	Lebanon, Voice of Hope	7125va			
		6280eu			

1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia, RTM Kota Kinabalu	5980do			
1000-1025	Netherlands, Radio	9720pa	11895au	13700pa	
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Russia, Voice of Russia WS	7150va	9835oa	11655as	11800pa
		12025as	15520as	17560as	17775as
		17870pa			
1000-1100	Singapore, SBC Radio One	6155do			
1000-1030	Switzerland, Swiss R Intl	6165eu	9535eu		
1000-1100	United Kingdom, BBC WS	5965na	6190af	6195va	9410eu
		9740as	11750as	11760as	11940af
		12095eu	13745va	15070va	15190sa
		15280va	15310as	15400af	15575va
		17640va	17705va	17790as	17830va
	17885af				
1000-1100	USA, KAIJ Dallas TX	5810am	9815am		
1000-1100	USA, KTNB Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13840as
1000-1100	USA, Voice of America	5985va	6165am	7405am	9590am
		11720va	15425va		
		7425na	15665eu		
1000-1100	USA, WEWN Birmingham AL	9400am			
1000-1100	USA, WGTG McCaysville GA	6040am	6185am		
1000-1100	USA, WHRI Noblesville IN	7490na	13595na		
1000-1100	USA, WJCR Upton KY	13825va			
1000-1100 as	USA, WVHA Greenbush ME	5065am	5935am	9475am	15685am
1000-1100	USA, WWCR Nashville TN	5950na			
1000-1100 vl/m-f	USA, WYFR Okeechobee FL	5880eu	11740af	15210af	17550af
1000-1030	Vatican State, Vatican R	9580as	15010as		
1000-1100	Vietnam, Voice of	6065af			
1000-1005 mtwhfa	Zambia, Christian Voice	6165do			
1030-1055	Zambia, ZNBC Radio 2	15450as	17870au		
1030-1057	Austria, R Austria Intl	7345eu	9505eu		
1030-1100	Czech Rep, Radio Prague	13645as	15235au		
1030-1100	Finland, YLE/R Finland	9530as			
1030-1100	Guam, AWR/KSDA	6045as	9650as	12065as	13705as
1030-1100	Netherlands, Radio	11715am			
1030-1055	South Korea, R Korea Intl	13675eu	15395eu	17825eu	21605me
1038-1055 1&3rd s	UAE, Radio Dubai	9480eu	15220na		
	Denmark, R Denmark Intl				

RADIO PROGRAMS

Continued from page 43

1930	Radio New Zealand Intl: "Mailbox (biweekly)"	1349	Radio Romania Intl: "DX Mailbag"
1930	AWR Latin America: "Wavescan"	1519	Radio Romania Intl: "DX Mailbag"
1947	Radio Bulgaria: "Radio Bulgaria Calling"	1600	WWCR #4 (Tennessee): "World of Radio"
2000	Radio For Peace Intl: "World of Radio"	1605	WWCR #3 (Tennessee): "Ham Radio and More"
2016	Radio Portugal Intl: "Radio Portugal DX (triweekly)"	1730	Voice of America (af): "Communications World"
2115	WWCR #1 (Tennessee): "World of Radio"	1730	Voice of America (me): "Communications World"
2130	WRMI (Florida): "Wavescan"	1730	Voice of America (south as): "Communications World"
2210	Australia, Radio: "Feedback"	1730	WHRI (Angel 1): "DXing with Cumbre"
2215	WWCR #1 (Tennessee): "World of Radio"	1730	WHRI (Angel 2): "DXing with Cumbre"
2230	WHRI (Angel 2): "DXing with Cumbre"	1800	Radio For Peace Intl: "World of Radio"
2345	Radio Bulgaria: "Radio Bulgaria Calling"	1909	HCJB (eu): "DX Partyline"
Saturdays		1915	Voice of Turkey: "DX Corner (biweekly)"
0010	Australia, Radio: "Feedback"	1949	Radio Romania Intl: "DX Mailbag"
0200	KWHR (Hawaii): "DXing with Cumbre"	1958	Vatican Radio: "On-the-Air"
0246	Radio Portugal Intl: "Radio Portugal DX (triweekly)"	2045	Radio Dnestr: "DX Herald (3)"
0400	Radio For Peace Intl: "World of Radio"	2115	Radio Budapest Intl: "Radio Budapest DX Show"
0500	KWHR (Hawaii): "DXing with Cumbre"	2124	Radio Exterior de Espana: "Distance Unknown"
0500	WHRI (Angel 1): "DXing with Cumbre"	2130	Voice of America (me): "Communications World"
0500	WHRI (Angel 2): "DXing with Cumbre"	2136	Radio Havana Cuba: "DXers Unlimited"
0739	HCJB (eu): "DX Partyline"	2149	Radio Romania Intl: "DX Mailbag"
0815	KTWR (Guam): "Pacific DX Report"	2215	Voice of Turkey: "DX Corner (biweekly)"
0909	HCJB (pac): "DX Partyline"	2230	WHRI (Angel 1): "DXing with Cumbre"
0940	FEBC (Philippines): "DX Dial"	2230	WRMI (Florida): "Wavescan"
0940	KTWR (Guam): "Pacific DX Report"	2236	Radio Havana Cuba: "DXers Unlimited"
1030	Voice of America (as pac): "Communications World"	2300	Vatican Radio: "On-the-Air"
1100	Radio For Peace Intl: "World of Radio"	2300	KSDA (Guam): "Wavescan"
1215	Radio Bulgaria: "Radio Bulgaria Calling"	2330	WRMI (Florida): "Wavescan"
1230	Voice of America (as pac): "Communications World"		
1245	Voice of Turkey: "DX Corner (biweekly)"		
1342	Radio Tashkent: "Radio Tashkent DX Program"		

FREQUENCIES

1100-1200	Australia, Radio	5995as 9615as 15530as	7240as 9860pa 15565as	9510pa 13605as	9580pa 15170as	1100-1200	United Kingdom, BBC WS	5965na 9410eu 11760as 15070va 17640va	6190af 9580as 11940af 15220va 17705va	6195va 9740va 11955as 15310as 17830af	7180as 11750as 12095eu 15575va 17885af
1100-1200 vl	Australia, VL8A Alice Spg	2310do				1100-1130	United Kingdom, BBC WS	9700au	15190sa	15400eu	17790va
1100-1200 vl	Australia, VL8K Katherine	2485do				1100-1200	USA, KAIJ Dallas TX	5810am	9815am		
1100-1200 vl	Australia, VL8T Tent Crk	4910do				1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	Canada, CFCX Montreal	6005do				1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	Canada, CFRX Toronto	6070do				1100-1200	USA, Monitor Radio Intl	6095na	7395ca	9355as	9430au
1100-1200	Canada, CFVP Calgary	6030do				1100-1200	USA, Voice of America	5985va	6110va	6165am	7405am
1100-1200	Canada, CHNX Halifax	6130do						9590am	9645va	9760va	11720va
1100-1200	Canada, CKZN St John's	6160do						15160va	15425va		
1100-1200	Canada, CKZU Vancouver	6160do						7425na	15665eu		
1100-1200	Costa Rica, Adv World R	7375am	9725am	13750am				9400am			
1100-1200	Costa Rica, RF Peace Intl	6205am	7385am					6040am	6185am		
1100-1200 s	Denmark, Radio ABC	7570eu						7490na	13595na		
1100-1130	Ecuador, HCJB	9445pa	12005am					13825am			
1100-1200 as	Eqt Guinea, R East Africa	15186af						5935am	7435am	9475am	15685am
1100-1200	Eqt Guinea, Radio Africa	9530as						5950na	11830na		
1100-1150	Germany, Deutsche Welle	15370af 17860af	15410af 21600af	17715af	17800af			6065af			
		13680eu						15470as	17900eu		
1100-1200 vl/as	Italy, IRRS	7125va						7220do			
1100-1200	Japan, NHK/Radio	6120na	9610as	15350as				6165do			
1100-1200	Jordan, Radio	11970eu						13730na			
1100-1200	Malaysia, Radio	7295do						13790as			
1100-1200 vl	Malaysia, RTM Kuching	7160do						8660as	11445as	11700as	
1100-1200 vl	Malaysia, RTM Kota Kinabalu	5980do						15115na	21455am		
1100-1125	Netherlands, Radio	6045as	9650as	12065as	13705as			11900na	15400na		
1100-1200	New Zealand, R NZ Intl	6100pa						11875me	11930me	15260af	
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na				7115eu	7190eu		
1100-1200 vl	Palau, KHBN/Voice of Hope	9730as	9985as	15140as				7115eu	15240na		
1100-1200 vl	Papua New Guinea, NBC	4890do						5990do	15210as	17550au	
1100-1200	Russia, Voice of Russia WS	4740as 15560as 17870as	11655as 16560as	15460as 17755as	15520as 17775as			6045eu	15240na		
		6155do						11650na	15570as	17550au	
1100-1200	Singapore, SBC Radio One	6015as	6155as					9595do	11620do	11710do	15185do
1100-1200	Singapore, R Singapore Int	13635as	15415as	17515as				7295eu	17740af		
1100-1130	Switzerland, Swiss R Intl	7445as									
1100-1200	Taiwan, Voice of Asia										

SELECTED PROGRAMS

Sundays

- 1110 Japan, Radio: Hello from Tokyo.
 1110 USA, VOA Washington DC (as pac): New Horizons.
 1110 USA, VOA Washington DC (ca): Critic's Choice.
 1130 UK, BBC London (af/as pac): Play of the Week. See S 0530.
 1130 UK, BBC London (am/eu): Variable Feature. Special features and new series.
 1130 UK, BBC London (south as): The Learning World. News and views about worldwide education.
 1145 UK, BBC London (south as): Good Books. Recommendation of a book to read.

Mondays

- 1105 UK, BBC London (am): Caribbean Report (Alternative). Weekday coverage of current affairs in the Caribbean region with emphasis on political and economic analysis.
 1130 Australia, Radio: Innovations.
 1130 Japan, Radio: Radio Japan Magazine Hour (M-F).
 1130 Sweden, Radio: Sixty Degrees North (M-F).
 1130 UK, BBC London (af): Meridian. See S 0630.
 1130 UK, BBC London (am/as pac): Variable Comedy/Quiz Feature. See S 1401.
 1130 UK, BBC London (eu): Omnibus. Each week a half-hour programme on practically any topic under the sun.
 1130 UK, BBC London (south as): Variable Feature. See S 1130.
 1130 USA, VOA Washington DC (as pac): Music USA (Standards).
 1145 UK, BBC London (south as): BBC English. See S 1515.

Tuesdays

- 1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
 1121 North Korea, R Pyongyang: The Immortal Story.
 1126 North Korea, R Pyongyang: Truth Idea.
 1130 New Zealand, Radio NZ Intl: On the March.
 1130 UK, BBC London (af/as pac/eu): Meridian. See S 0630.
 1130 UK, BBC London (am): Jazz Now and Then. See S 1230.
 1130 UK, BBC London (south as): BBC English. See S 1515.
 1130 USA, VOA Washington DC (as pac): Now Music USA.
 1132 Russia, Voice of: Folk Box.
 1145 UK, BBC London (am): Youth. Your Questions of Faith. NEW! Ben Cohen (of Megamix) and young experts answer listeners' questions about religion.

- 1145 UK, BBC London (am): Variable Feature. See S 1130.

Wednesdays

- 1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
 1120 North Korea, R Pyongyang: The Reminiscences of the Great Leader.
 1130 Australia, Radio: Science File.
 1130 UK, BBC London (af/am/as pac/eu): 30-Minute Drama. Variable drama programs.
 1130 UK, BBC London (south as): BBC English. See S 1515.
 1130 USA, VOA Washington DC (as pac): Now Music USA.
 1130 USA, WWCR #1 Nashville TN: World of Radio.
 1132 Russia, Voice of: Folk Box.
 1139 North Korea, R Pyongyang: The Great Man of the Century.
 1154 Radio Netherlands: Documentary. Living on the Land — Part 3 (7th). A three part series. Part 3 looks at what its like to live on one of the newest Polderlands in Holland.
 1154 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (14th). See A 2354.
 1154 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (21st). See F 1454.
 1154 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (28th). See F 2354.

Thursdays

- 1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
 1122 North Korea, R Pyongyang: Words of the Great Leader.
 1130 New Zealand, Radio NZ Intl: Trading Post.
 1130 UK, BBC London (af/eu): Meridian On Screen. See T 1615.
 1130 UK, BBC London (am): From Our Own Correspondent. See S 0330.
 1130 UK, BBC London (as pac): Meridian. See S 0630.
 1130 UK, BBC London (south as): Education. The World of Computers. See M 1230.
 1130 USA, VOA Washington DC (as pac): Now Music USA (Top Ten).
 1130 USA, WWCR #1 Nashville TN: Ken's Country Classics.
 1145 UK, BBC London (am): The Learning World. See S 1130.
 1145 UK, BBC London (south as): BBC English. See S 1515.

Fridays

- 1105 UK, BBC London (am): Caribbean Report (Alternative). See M 1105.
 1121 North Korea, R Pyongyang: Immortal Ideas of the Great Leader.
 1130 UK, BBC London (af/eu): Meridian. See S 0630.
 1130 UK, BBC London (am): Focus on Faith. See F 0330.
 1130 UK, BBC London (as pac): Music Review. See S 0230.
 1130 UK, BBC London (south as): BBC English. See S 1515.
 1130 USA, VOA Washington DC (as pac): Country Music USA.
 1138 North Korea, R Pyongyang: The Great Man of the Country.

Saturdays

- 1110 Japan, Radio: This Week.
 1130 Costa Rica, R for Peace Intl: RFPI's Mailbag.
 1130 North Korea, R Pyongyang: All People Free.
 1130 UK, BBC London (af): Focus on Faith. See F 0330.
 1130 UK, BBC London (am): For and Against. See S 0130.
 1130 UK, BBC London (as pac/eu/south as): Meridian. See S 0630.
 1130 USA, VOA Washington DC (as pac): Press Conference USA.
 1130 USA, VOA Washington DC (ca): Music USA (Standards).
 1138 Germany, Deutsche Welle: Saturday Special.

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FREQUENCIES

1200-1300	Australia, Radio	5995pa	6060pa	6080pa	7260as	1200-1300	Singapore, R Singapore Int	6015as	6155as		
		9560as	9580pa	9615as	9710as	1200-1300	South Korea, R Korea Int	7285va			
		11800pa	15565as			1200-1300	Switzerland, Swiss R Int	6165eu	9535eu		
1200-1300 mtwhf	Belgium, R Vlaanderen Int	13610na				1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	Brazil, Radio Bras	15445na				1200-1300	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
1200-1230	Bulgaria, Radio	13790as					9410eu	9580as	9740va	11750as	11760as
1200-1215	Cambodia, Natl Voice of	11940as					11955as	12095eu	15070va	15220va	15310as
1200-1300 vl	Canada, CBC N Quebec Svc	9625do					17640va	17705va	17830af	17885af	21660af
1200-1300	Canada, CFCX Montreal	6005do				1200-1300	USA, KAIJ Dallas TX	5810am	9815am		
1200-1300	Canada, CFRX Toronto	6070do				1200-1300	USA, KTN Salt Lk City UT	7510am			
1200-1300	Canada, CFVP Calgary	6030do				1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	Canada, CHNX Halifax	6130do				1200-1300	USA, Monitor Radio Int	6095na	9355as	9430au	9455sa
1200-1300	Canada, CKZN St John's	6160do				1200-1300	USA, Voice of America	6110va	9645va	9760va	11715va
1200-1300	Canada, CKZU Vancouver	6160do						15160va	15425va		
1200-1259	Canada, R Canada Intl	9640am	11855am	13650am		1200-1300	USA, WEWN Birmingham AL	7425na	15665eu		
1200-1300	China, China Radio Intl	7385na	7410as	9565as	9715as	1200-1300	USA, WGTG McCaysville GA	9400am			
		11660as	11795pa	15440au		1200-1300	USA, WGTG McCaysville GA	9400am			
1200-1230 vl	China, China Radio Intl	8660as	11445as	11700as	12110as	1200-1300	USA, WHRI Noblesville IN	6040am	6185am		
1200-1300	Costa Rica, Adv World R	5030am	6150am	9725am	13750am	1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300	Costa Rica, RF Peace Intl	6205am	7385am	15050am		1200-1300 s	USA, WRMI/R Miami Intl	9955am			
1200-1300	Ecuador, HCJB	12005am	15115am	21455am		1200-1300 as	USA, WVHA Greenbush ME	13825va			
1200-1300 as	Eqt Guinea, R East Africa	15186af				1200-1300	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1200-1300	Eqt Guinea, Radio Africa	9530as				1200-1300	USA, WYFR Okeechobee FL	5950na	6015na	11830na	17750na
1200-1300	France, Radio France Intl	9805eu	11600as	11670as	13625am	1200-1230	Uzbekistan, R Tashkent	7190as	9715as	15295as	
		15155eu	15195eu	15325af	15530ca	1200-1300	Zambia, Christian Voice	6065af			
		11875me	11930me	15260af		1200-1300 mtwhf	Zambia, ZNBC Radio 2	6165do			
1200-1230	Iran, VOIRI	13680eu				1205-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1200-1300	Iraq, Radio Iraq Intl	7125va				1215-1300	Egypt, Radio Cairo	17595as			
1200-1300 vl/as	Italy, IRRS	7295do				1230-1300	Bangladesh, Radio	7185as	9548as		
1200-1300	Malaysia, Radio	9980do				1230-1255 s	Belgium, R Vlaanderen Int	13610na	15540as		
1200-1300 vl	Malaysia, RTM Kota Kinabalu	5990do				1230-1300	Bulgaria, Radio	15620as			
1200-1250	Myanmar, Voice of	6045eu	7190eu			1230-1259	Canada, R Canada Intl	6150as	15195as		
1200-1300	Netherlands, Radio	6100pa				1230-1300 mtwhf	Finland, YLE/R Finland	11900na	15400na		
1200-1206	New Zealand, R NZ Intl	9590eu	13800eu	15305eu		1230-1235	India, All India Radio	4860do	6185do	17865do	
1200-1230 s	Norway, Radio Norway Intl	9730as	9955as	9965as	9985as	1230-1300 w	Indonesia, RRI Sorong	4875do			
1200-1300 vl	Palau, KHBN/Voice of Hope	15140as				1230-1300	Mongolia, R Ulan Bator	9745as	12085as		
1200-1255	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu	1230-1300	South Korea, R Korea Int	9570as	9640as	13670as	
		11815eu				1230-1300 mtwhf	Sri Lanka, Sri Lanka BC	15425as			
1200-1300	Russia, Voice of Russia WS	4740as	4975as	11655as	11785as	1230-1300	Sweden, Radio	13740as	15240pa		
		15110as	15230as	15435as	15510as	1230-1300	Turkey, Voice of	9445na	9630na		
		15520as	17755as	17775as	17870as	1230-1300	Vietnam, Voice of	9840as	12010as		
1200-1300	Singapore, SBC Radio One	6155do				1238-1255 1&3rd s	Denmark, R Denmark Intl	9590va	13800va	15305va	15480va
						1240-1250	Greece, Voice of	11645af			

SELECTED PROGRAMS

Sundays

- 1200 UK, BBC London (af/as pac): Play of the Week (from 1130). See S 0530.
- 1205 UK, BBC London (am/eu/south as): World Business Brief. Focus on the market week.
- 1215 UK, BBC London (am). Anything Goes. See S 0530; (eu): Britain Today. See S 0045; (south as): A Jolly Good Show. Dave Lee Travis presents your record requests.
- 1216 France, Radio France Intl: African Analysis (biweekly).
- 1223 France, Radio France Intl: Paris Promenade.
- 1228 France, Radio France Intl: Counterpoint (biweekly).
- 1230 UK, BBC London (af): Jazz Now and Then. Sarah Ward presents a mixture of jazz; (as pac): Andy Kershaw's World of Music. Recordings of diverse music from around the world; (eu): Anything Goes. See S 0530.
- 1230 USA, VOA Washington DC (as pac): The Writers' World (3).
- 1234 France, Radio France Intl: Club 9516.
- 1235 Belgium, R Vlaanderen Intl: Radio World.
- 1240 South Korea, Radio Korea Intl: Shortwave Feedback.
- 1245 Belgium, R Vlaanderen Intl: PO Box 26.
- 1245 UK, BBC London (af/am): Sports Roundup. See S 0135.

Mondays

- 1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. Latest news from the markets in the Far East, Europe and the USA.
- 1205 UK, BBC London (am): Caribbean Business Program (Alt.). Economic analysis in the region.
- 1210 UK, BBC London (am): Caribbean Report (Alt.). See M 1105.
- 1210 USA, VOA Washington DC (as pac): Stateside (M-F).
- 1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
- 1215 UK, BBC London (am): Education. Legal Rights. Legal Wrongs. Rosalind English talks to individuals whose lives have been affected by the law and to experts about the rights of individuals.
- 1230 UK, BBC London (af): Global Concerns. Update on environmental issues; (am): Education. The World of Computers. NEW! In this 7-part series you hear how computers work; (as pac): Off the Shelf. See M 0330; (eu): Andy Kershaw's World of Music. See S 1230; (south as): Andy Kershaw's World of Music. See S 1230.
- 1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.
- 1247 France, Radio France Intl: Arts in France.

Tuesdays

- 1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
- 1205 UK, BBC London (am): Caribbean Business Program (Alt.). See M 1205.
- 1210 UK, BBC London (am): Caribbean Report (Alt.). See M 1105.
- 1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
- 1215 UK, BBC London (am): John Peel. See M 1330.
- 1230 UK, BBC London (af): Folk Routes. See S 0030; (as pac): Off the Shelf. See M 0330; (eu): Britain Today. Panel quiz show; (south as): Multitrack Hit-List. See M 1615.
- 1232 USA, WWCR #1 Nashville TN: World of Radio.
- 1245 Russia, Voice of. This is Russia.
- 1250 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.
- 1250 France, Radio France Intl: Science Probe.

Wednesdays

- 1205 UK, BBC London (af/am/as pac/eu/south as): World Business. See M 1205; (am): Caribbean Business Program (Alt.). See M 1205.
- 1210 UK, BBC London (am): Caribbean Report (Alt.). See M 1105.
- 1215 UK, BBC London (af): Britain Today. See S 0045.
- 1215 UK, BBC London (am): The Vintage Chart Show. Each week a classic Top 20 from the past with Paul Burnett.
- 1215 UK, BBC London (as pac/eu/south as): Britain Today. See S 0045.
- 1230 UK, BBC London (af): Youth. Your Questions of Faith. See T 1145.
- 1230 UK, BBC London (as pac): Off the Shelf. See M 0330.
- 1230 UK, BBC London (eu): Composer of the Month. See M 0430.
- 1230 UK, BBC London (south as): Megamix. See T 1615.
- 1242 France, Radio France Intl: The Bottom Line.
- 1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.
- 1247 France, Radio France Intl: Land of France.

Thursdays

- 1205 UK, BBC London (af/am/as pac/eu/south as): World Business. See M 1205; (am): Caribbean Business Program (Alt.). See M 1205.
- 1210 Canada, RCI Montreal: As It Happens.
- 1210 UK, BBC London (am): Caribbean Report (Alt.). See M 1105.
- 1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045.
- 1215 UK, BBC London (am): Assignment. See H 0230.

- 1230 UK, BBC London (af): From Our Own Correspondent. See S 0330; (as pac): Off the Shelf. See M 0330; (eu): Assignment. See H 0230; (south as): Multitrack X-Press. See W 1615.
- 1239 Finland, Radio: Media Review.
- 1244 France, Radio France Intl: The Americas Magazine.
- 1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.
- 1249 France, Radio France Intl: North/South (biweekly).
- 1249 France, Radio France Intl: Planet Earth (biweekly).

Fridays

- 1205 UK, BBC London (af/am/as pac/eu/south as): World Business. See M 1205; (am): Caribbean Business Program (Alt.). See M 1205.
- 1210 UK, BBC London (am): Caribbean Report (Alt.). See M 1105.
- 1215 UK, BBC London (af/as pac/eu/south as): Britain Today. See S 0045; (am): New Ideas. See S 2330.
- 1230 UK, BBC London (af): The Farming World. See S 1445; (as pac): Off the Shelf. See M 0330; (eu): Science in Action. See S 0430; (south as): Focus on Faith. See F 0330.
- 1235 UK, BBC London (am): The Insider's Guide. See F 0005.
- 1241 France, Radio France Intl: Film Reel.
- 1245 UK, BBC London (af/am/as pac): Sports Roundup. See S 0135.
- 1248 France, Radio France Intl: Made in France.
- 1254 France, Radio France Intl: Documentary. Living on the Land — Part 2 (2 Aug). See F 2354; Wake of the Half Moon — Part 3 (9th). See W 1154; Part 1 (16th). See A 2354; Part 2 (23rd). See F 1454; Part 3 (30th). See F 2354.

Saturdays

- 1205 UK, BBC London (af/am/as pac/eu/south as): World Business Report. See M 1205.
- 1210 Australia, Radio: Ockham's Razor.
- 1215 South Korea, Radio Korea Intl: Music Trap.
- 1215 UK, BBC London (af/eu/south as): Britain Today. See S 0045.
- 1215 UK, BBC London (am): A Jolly Good Show. See S 1215.
- 1215 UK, BBC London (as pac): Science in Action. See S 0430.
- 1228 France, Radio France Intl: Spotlight on Africa.
- 1230 UK, BBC London (af): Seven Days. See A 0010; (eu): Variable Comedy/Quiz Feature. See S 1401; (south as): Multitrack Alt. See F 1330.
- 1230 USA, VOA Washington DC (as pac): Communications World.
- 1235 South Korea, Radio Korea Intl: From Us to You.
- 1245 UK, BBC London (af): The Insider's Guide. See F 0005.
- 1245 UK, BBC London (as pac): Letter from America. See S 0030.
- 1255 UK, BBC London (af): Book Choice. See S 1525.

FREQUENCIES

1300-1400	Australia, Radio	5995pa	7240as	9560pa	9580pa	1300-1400	United Kingdom, BBC WS	5965na	5990as	6190af	6195va
		9610as	11800pa					9410eu	9515va	9590va	9740as
1300-1330	Australia, Radio	6060pa	6080as	9510pa				11750as	11760as	11940af	12095eu
1300-1355 mtwhfa	Belgium, R Vlaanderen Int	13610na	15540as					15070va	15220am	15310as	15420af
1300-1320	Brazil, Radio Bras	15445na						15575va	17640va	17705va	17830af
1300-1330	Bulgaria, Radio	15620as					17885af	21470af	21660af		
1300-1400 vl	Canada, CBC N Quebec Svc	9625do				1300-1400	USA, KAIJ Dallas TX	5810am	15725am		
1300-1400	Canada, CFCX Montreal	6005do				1300-1400	USA, KJES Mesquite NM	11715na			
1300-1400	Canada, CFRX Toronto	6070do				1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	Canada, CFPV Calgary	6030do				1300-1400	USA, KTNB Salt Lk City UT	7510am			
1300-1400	Canada, CHNX Halifax	6130do				1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455na	13840as
1300-1400	Canada, CKZN St John's	6160do				1300-1400	USA, Voice of America	6110va	9645va	9760va	15160va
1300-1400	Canada, CKZU Vancouver	6160do						15425va			
1300-1359 mtwhfa	Canada, R Canada Intl	9640am	11855am	13650am		1300-1330	USA, Voice of America	11715va			
1300-1400	China, China Radio Intl	7385na	9715as	11660pa		1300-1400	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1300-1330	China, China Radio Intl	7410as				1300-1400	USA, WGTG McCaysville GA	9400am			
1300-1400	Costa Rica, RF Peace Intl	6205am	7385am	15050am		1300-1400	USA, WHRI Noblesville IN	6040am	15105am		
1300-1330	Czech Rep, Radio Prague	11660eu	17845af			1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400	Ecuador, HCJB	12005am	15115am	21455am		1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1330	Egypt, Radio Cairo	17595as				1300-1400	USA, WRNO New Orleans LA	15420am			
1300-1400 as	Eqt Guinea, R East Africa	15186af				1300-1400 as	USA, WVHA Greenbush ME	15745eu			
1300-1400	Eqt Guinea, Radio Africa	9530as				1300-1400	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1300-1400	Iraq, Radio Iraq Intl	13680as				1300-1400	USA, WYFR Okeechobee FL	5950na	11830na	13695na	17750na
1300-1330 vl/as	Italy, IRRS	7125va				1300-1400	Zambia, Christian Voice	6065af			
1300-1400	Malaysia, Radio	7295do				1300-1330 mtwhf	Zambia, ZNBC Radio 2	6165do			
1300-1400 vl	Malaysia, RTM Kuching	7160do				1303-1310	Croatia, Croatian Radio	5920eu	7165eu	13830am	
1300-1400 vl	Malaysia, RTM KotaKinabalu	5980do				1330-1355	Austria, R Austria Intl	6155eu	13730eu		
1300-1325	Netherlands, Radio	6045eu	7190eu			1330-1359 s	Canada, R Canada Intl	11855am	11935eu	15325va	21455va
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa				1330-1359 mtwhfa	Canada, R Canada Intl	17820va			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as	1330-1359	Canada, R Canada Intl	9535as	11795as		
		15430as				1330-1400	Guam, AWR/KSDA	9650as			
1300-1330 s	Norway, Radio Norway Intl	13800as	15340na			1330-1400	India, All India Radio	11620as	13750as		
1300-1400 vl	Palau, KBN/Voice of Hope	9730as	9955as	9965as	9985as	1330-1400 vl	Italy, IRRS	3985va			
		15140as				1330-1400	Netherlands, Radio	9895as	13700as	15150as	
1300-1400	Philippines, FEBC/R Intl	11995as				1330-1400	Sweden, Radio	6090na	9835as	13740na	15240na
1300-1356	Romania, R Romania Intl	9690eu	11940eu	15365eu	17720eu	1330-1355	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1300-1400	Russia, Voice of Russia WS	15340as	15460as	15560as	17755as	1330-1400	Uzbekistan, R Tashkent	7190as	9715as	15295as	
1300-1400	Singapore, SBC Radio One	6155do				1330-1400	Vietnam, Voice of	9840as	12010as		
1300-1400	Singapore, R Singapore Int	6015as	6155as			1335-1345	Greece, Voice of	15175na	15630na		
1300-1400 mtwhf	Sri Lanka, Sri Lanka BC	15425as				1338-1355 1&3rd s	Denmark, R Denmark Intl	9590va	13800va	15305va	15340va
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	13635as	15240as	1345-1400	Vatican State, Vatican R	9500as	11625as	13765au	

SELECTED PROGRAMS

Sundays

- 1300 North Korea, R Pyongyang: Anthem.
 1300 Norway, Radio Norway Intl: Norway Now.
 1311 Canada, RCI Montreal: Sunday Morning (1st hour).
 1330 Australia, Radio: The Europeans.
 1330 USA, WRMI/R Miami Intl: Battle Cry Sounding.
 1335 Canada, RCI Montreal: The Mailbag.

Mondays

- 1300 North Korea, R Pyongyang: Anthem.
 1300 UK, BBC London (af): Variable Feature (Alternative). See S 1130.
 1300 USA, KTNB Salt Lk City UT: A New Perspective.
 1310 Australia, Radio: Asia Focus.
 1311 Belgium, R Vlaanderen Intl: Belgium Today (M-F).
 1311 Russia, Voice of: Moscow Mailbag.
 1315 UK, BBC London (af): BBC English (Alternative). See S 1515.
 1321 Belgium, R Vlaanderen Intl: Tourism.
 1330 UK, BBC London (af): John Peel. Tracks from newly released albums and singles from the contemporary music scene.
 1332 Russia, Voice of: Audio Book Club.
 1339 Canada, RCI Montreal: Spectrum (M-F).

Tuesdays

- 1300 UK, BBC London (af): BBC English (Alternative). See S 1515.
 1300 USA, KTNB Salt Lk City UT: A New Perspective.
 1310 Australia, Radio: Asia Focus.
 1310 USA, VOA Washington DC (as pac): Inside USA.
 1311 Russia, Voice of: Newmarket.
 1326 Romania, Radio Romania Intl: Romanian Anglicists.
 1330 Australia, Radio: Jazz Notes.
 1330 UK, BBC London (af): Multitrack Hit-List. See M 1615.
 1332 Russia, Voice of: Kaleidoscope.
 1336 Romania, Radio Romania Intl: Youth Club.
 1345 Vatican State, Vatican Radio: A Room with a View of the Vatican.
 1359 Vatican State, Vatican Radio: Ask the Abbot.

Wednesdays

- 1300 UK, BBC London (af): BBC English (Alternative). See S 1515.
 1300 USA, KTNB Salt Lk City UT: A New Perspective.
 1305 Canada, RCI Montreal: The Best of CBC.
 1310 Australia, Radio: Asia Focus.
 1311 Russia, Voice of: Moscow Mailbag.
 1316 Belgium, R Vlaanderen Intl: Living in Belgium.
 1320 Belgium, R Vlaanderen Intl: Green Society.
 1328 North Korea, R Pyongyang: The Reminiscences of the Great Leader.
 1330 UK, BBC London (af): Megamix. See T 1615.
 1339 North Korea, R Pyongyang: The Great Man of the Century.
 1354 Radio Netherlands: Documentary. Living on the Land — Part 3 (7th). See W 1154.
 1354 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (14th). See A 2354.
 1354 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (21st). See F 1454.
 1354 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (28th). See F 2354.

Thursdays

- 1300 UK, BBC London (af): Education. The World of Computers. (Alternative). See M 1230.
 1310 Australia, Radio: Asia Focus.
 1310 USA, VOA Washington DC (as pac): Reporter's Notebook.
 1311 Russia, Voice of: Moscow Mailbag.
 1315 UK, BBC London (af): BBC English (Alternative). See S 1515.
 1330 Australia, Radio: Australian Country Style.
 1330 Guam, AWR/KSDA: Music.
 1330 UK, BBC London (af): Multitrack X-Press. See W 1615.
 1332 Russia, Voice of: Kaleidoscope.

Fridays

- 1300 UK, BBC London (af): BBC English (Alternative). See S 1515.
 1300 USA, KTNB Salt Lk City UT: A New Perspective.
 1310 Australia, Radio: Asia Focus.
 1311 Russia, Voice of: Moscow Mailbag.
 1319 Belgium, R Vlaanderen Intl: Economics.
 1330 UK, BBC London (af): Multitrack Alternative. Latest developments on the British music scene.
 1344 Uzbekistan, Radio Tashkent: Asian Marketplace (3).

Saturdays

- 1310 Belgium, R Vlaanderen Intl: Music from Flanders.
 1310 Romania, Radio Romania Intl: The Week.
 1317 Romania, Radio Romania Intl: World of Culture.
 1328 Romania, Radio Romania Intl: Radio Pictures.
 1332 Russia, Voice of: Audio Book Club.
 1343 Romania, Radio Romania Intl: Bucharest Along the Centuries.
 1349 Romania, Radio Romania Intl: Radio Romania DX Mailbag.

HAUSER'S HIGHLIGHTS
USA: WWCR, NASHVILLE

Selected Programs

- Rock the Universe*
 Mon 0500 7435, Sun 1300 9475,
 Thu 0900 7435
Ken's Country Classics
 Mon 0630 7435, Thu 1130 15685,
 Sat 1630 9475
The Old Record Shop
 Sun 0100 3215, Mon 0600 7435
Spectrum
 Sun 0200-live 5065 & 2390,
 Mon 0800 7435
Ham Radio & More
 Sun 2206-live 7435 & 12160,
 Mon 0300 5065, Mon 0900 7435,
 Sat 1605 12160
The Net Connection
 Sun 1800-live 9475
 (Continued p. 63)

FREQUENCIES

1400-1430	Australia, Radio	7240as	9560as	9610pa	11695pa	1400-1500	United Kingdom, BBC WS	5990as	6195as	7205as	9410eu
1400-1500	Australia, Radio	5995pa	9580pa	9615as	11800pa			9515na	9590va	9740as	11750as
1400-1500 vl	Canada, CBC N Quebec Svc	9625do						11865am	11940af	12095eu	15070va
1400-1500	Canada, CFCX Montreal	6005do						15220am	15260na	15575va	17640va
1400-1500	Canada, CFRX Toronto	6070do						17705va	17830af	17840af	21470af
1400-1500	Canada, CFVP Calgary	6030do					21660af				
1400-1500	Canada, CHNX Halifax	6130do				1400-1500	USA, KAIJ Dallas TX	13815am	15725am		
1400-1500	Canada, CKZN St John's	6160do				1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	Canada, CKZU Vancouver	6160do				1400-1500	USA, KTNB Salt Lk City UT	7510am			
1400-1459	Canada, R Canada Intl	11855au	13650am			1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	China, China Radio Intl	7405na	9530as	9785as	11815as	1400-1500	USA, Voice of America	6110va	7125as	7215as	9645as
1400-1500	Costa Rica, RF Peace Intl	6205am	7385am	15050am				9760as	15255va	15395as	15425va
1400-1500	Ecuador, HCJB	21455am				1400-1500	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1400-1430	Ecuador, HCJB	12005am	15115am			1400-1500	USA, WGTG McCaysville GA	9400am			
1400-1500 as	Eqt Guinea, R East Africa	15186af				1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500	France, Radio France Intl	7110as	15405as	17560me		1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	India, All India Radio	11620as	13750as			1400-1500	USA, WRMI/R Miami Intl	9955na			
1400-1430	Israel, Kol Israel	12077va	15615na			1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500 vl	Italy, IRRS	3985va				1400-1500 as	USA, WVHA Greenbush ME	15745eu			
1400-1500	Japan, NHK/Radio	9535na	11705na	11895as	11915as	1400-1500	USA, WWCR Nashville TN	12160am	13845am	15685am	
1400-1500	Jordan, Radio	11970eu				1400-1500	USA, WYFR Okeechobee FL	11550as	11830na	17750eu	
1400-1500	Malaysia, Radio	7295do				1400-1415	Vatican State, Vatican R	9500as	11625as	13765au	
1400-1500 vl	Malaysia, RTM Kuching	7160do				1400-1500	Zambia, Christian Voice	6065af			
1400-1500 vl	Malaysia, RTM KotaKinabalu	5980do				1400-1405 mtwhf	Zambia, ZNBC Radio 2	6165do			
1400-1430 vl	Mexico, Radio Mexico Intl	9705na				1415-1500 mtwhfa	Bhutan, Bhutan BC Service	5023do			
1400-1500	Netherlands, Radio	9895as	13700as	15150as		1415-1425	Nepal, Radio	7165do			
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa				1430-1500	Australia, Radio	6060na	6080as	6090me	11660eu
1400-1500 vl	Palau, KHBN/Voice of Hope	9730as	9955as	9965as	9985as			11695pa	12080pa		
		15140as				1430-1500 vl	China, China Radio Intl	8660as	9880as	11445as	15135as
1400-1500	Philippines, FEBC/R Intl	11995as				1430-1440	India, All India Radio	3945do	6185do	9565do	9685do
1400-1500	Russia, Voice of Russia WS	4740me	4940me	7225me	9595me	1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
		9705me	11835me	11945me	11985me	1430-1500 mtwhf	Portugal, R Portugal Intl	21515me			
		15320me	15350me	15430me	15540me	1430-1500	Romania, R Romania Intl	11775as	15335as		
		15560me				1430-1500	United Kingdom, BBC WS	15400af			
1400-1500	Singapore, SBC Radio One	6155do				1438-1455 1&3rd s	Denmark, R Denmark Intl	13800na	15340as		
1400-1500	Sri Lanka, Sri Lanka BC	15425as				1440-1500	Myanmar, Voice of	5990do			
						1458-1500	Seychelles, FEBA Radio	9810as	11870as		

SELECTED PROGRAMS

Sundays

- 1401 UK, BBC London (af/am/eu/south as): Variable Feature. See S 1130.
- 1401 UK, BBC London (as pac): Variable Comedy/Quiz Feature. These programs are panel quizzes and other light entertainment in a format heard in America decades ago.
- 1406 Canada, RCI Montreal: Sunday Morning (2nd hour).
- 1425 Japan, Radio: Media Roundup.
- 1430 UK, BBC London (af/as pac/eu): Classical Music Feature (18th, 25th). A variable program featuring the world of classical music.
- 1430 UK, BBC London (am): Classical Music Feature (4th, 11th). Music Through Stained Glass. A look at the history of Christian liturgical music.
- 1445 UK, BBC London (af/eu): Letter from America. See S 0030.
- 1445 UK, BBC London (as pac): Write On. See S 0345.
- 1445 UK, BBC London (south as): The Farming World. Reports on new developments from around the world.
- 1454 Netherlands, Radio: Siren Song.
- 1455 UK, BBC London (as pac): Voicebox. Experts and ordinary people take a light-hearted look at the English language.

Mondays

- 1400 USA, WWCR #1 Nashville TN: The Olympic Report (M-F).
- 1401 UK, BBC London (af): Omnibus. See M 1130.
- 1405 UK, BBC London (am/as pac/eu/south as): Outlook. An up-to-the-minute mix of conversation, controversy and color from around the world.
- 1415 Japan, Radio: Radio Japan Magazine Hour (M-F).
- 1430 UK, BBC London (af): Off the Shelf. See M 0330.
- 1430 UK, BBC London (af): Variable Feature (Alternative). See S 1130.
- 1430 UK, BBC London (am): Omnibus. See M 1130.
- 1430 UK, BBC London (as pac): Health Matters. See M 0445.
- 1430 UK, BBC London (eu): John Peel. See M 1130.
- 1430 UK, BBC London (south as): Record News. See S 0445.
- 1432 Russia, Voice of: Folk Box.
- 1445 UK, BBC London (af): BBC English (Alternative). See S 1515.
- 1445 UK, BBC London (af): The Farming World. See S 1445.
- 1445 UK, BBC London (south as): Development '96. See S 0615.

Tuesdays

- 1401 UK, BBC London (af): On Screen. Film reviews and movie news from around the world.
- 1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M

- 1405.
- 1430 UK, BBC London (af): BBC English (Alternative). See S 1515.
- 1430 UK, BBC London (af): Off the Shelf. See M 0330.
- 1430 UK, BBC London (am): Health Matters. See M 0445.
- 1430 UK, BBC London (as pac): Youth. Pop Science. See T 1530.
- 1430 UK, BBC London (eu): Multitrack Hit-List. See M 1615.
- 1430 UK, BBC London (south as): Variable Feature. See S 1130.
- 1445 UK, BBC London (af): The Learning World. See S 1130.
- 1445 UK, BBC London (am): Jazz Now and Then. See S 1230.
- 1445 UK, BBC London (south as): Health Matters. See M 0445.
- 1456 Romania, Radio Romania Intl: Romanian Anglicists.

Wednesdays

- 1401 UK, BBC London (af): Youth. Pop Science. See T 1530.
- 1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M 1405.
- 1430 UK, BBC London (af): BBC English (Alternative). See S 1515.
- 1430 UK, BBC London (af): Off the Shelf. See M 0330.
- 1430 UK, BBC London (am): Country Style. See S 0010.
- 1430 UK, BBC London (eu): Omnibus. See M 1130.
- 1430 UK, BBC London (eu): Megamix. See T 1615.
- 1430 UK, BBC London (south as): Variable Music Feature. See S 1430.
- 1432 Russia, Voice of: The Jazz Show.
- 1445 UK, BBC London (af/am/south as): Good Books. See S 1145.

Thursdays

- 1401 UK, BBC London (af): Health Matters. See M 0445.
- 1405 UK, BBC London (am/as pac/eu/south as): Outlook. See M 1405.
- 1415 UK, BBC London (af): Record News. See S 0445.
- 1430 UK, BBC London (af): Education (Alternative). The World of Computers. See M 1230.
- 1430 UK, BBC London (af): Off the Shelf. See M 0330.
- 1430 UK, BBC London (eu): Network UK. Issues and events affecting the lives of people throughout the UK.
- 1430 UK, BBC London (as pac): Assignment. See H 0230.
- 1430 UK, BBC London (eu): Multitrack X-Press. See W 1615.
- 1430 UK, BBC London (south as): Sports International. See H 0630.
- 1445 UK, BBC London (af): BBC English (Alternative). See S 1515.
- 1445 UK, BBC London (af): Country Style. See S 0010.

Fridays

- 1401 UK, BBC London (af): Science in Action. See S 0430.
- 1405 UK, BBC London (am/as pac): Outlook. See M 1405.

- 1405 UK, BBC London (eu/south as): Outlook. See M 1405.
- 1430 UK, BBC London (af): BBC English (Alternative). See S 1515.
- 1430 UK, BBC London (af): Off the Shelf. See M 0330.
- 1430 UK, BBC London (am): Science in Action. See S 0430.
- 1430 UK, BBC London (as pac): Focus on Faith. See F 0330.
- 1430 UK, BBC London (eu): Multitrack Alternative. See F 1330.
- 1430 UK, BBC London (south as): The Insider's Guide. See F 0005.
- 1432 Russia, Voice of: Music at Your Request.
- 1440 UK, BBC London (south as): Voicebox. See S 1455.
- 1445 UK, BBC London (af): On the Move. See S 0445.
- 1445 UK, BBC London (south as): Global Concerns. See M 1230.
- 1454 Radio Netherlands: Documentary. Living on the Land — Part 2 (2 Aug). See F 2354.
- 1454 Radio Netherlands: Documentary. Living on the Land — Part 3 (9th). See W 1154.
- 1454 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (16th). See A 2354.
- 1454 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (23rd). A three part series. David Swatling traces the history of the 17th century Dutch colony New Netherland.
- 1454 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (30th). See F 2354.

Saturdays

- 1400 USA, WHRI Noblesville IN (Angel 1): Home Schooling (live).
- 1400 USA, WWCR #3 Nashville TN: The Great American Polka Show.
- 1405 UK, BBC London (af/am/as pac/eu/south as): Sportsworld. The weekly sports magazine.
- 1405 USA, WWCR #4 Nashville TN: C.O.P.S. (live).
- 1410 Japan, Radio: This Week.
- 1410 USA, VOA Washington DC (as pac): Music USA (Jazz).
- 1410 USA, VOA Washington DC (as): Music USA (Jazz).
- 1410 USA, VOA Washington DC (me): Music USA (Jazz).
- 1430 Australia, Radio: The Health Report.
- 1432 Russia, Voice of: Timelines.
- 1440 Romania, Radio Romania Intl: The Week.
- 1447 Romania, Radio Romania Intl: World of Culture.

FREQUENCIES

1500-1600	Australia, Radio	5995pa	6060pa	6080pa	6090as	1500-1600	S Africa, Channel Africa	3220af	7155af
		7260as	9580pa	9615as	9710pa	1500-1600	Seychelles, FEBA Radio	9810as	11870as
		11660as	11695pa	11800pa	12080pa	1500-1600	Singapore, SBC Radio One	6155do	
1500-1600 vi	Canada, CBC N Quebec Svc	9625do				1500-1600 mtwhf	Sri Lanka, Sri Lanka BC	9720as	15425as
1500-1600	Canada, CFCX Montreal	6005do				1500-1530	Switzerland, Swiss R Intl	12075as	13635as
1500-1600	Canada, CFBX Toronto	6070do				1500-1600	United Kingdom, BBC WS	5990as	15530as
1500-1600	Canada, CFPV Calgary	6030do						9410eu	9515na
1500-1600	Canada, CHNX Halifax	6130do						11865am	12095as
1500-1600	Canada, CKZN St John's	6160do						15400as	15070as
1500-1600	Canada, CKZU Vancouver	6160do						17705va	17830af
1500-1559 s	Canada, R Canada Intl	11855am	13650am			1500-1530	United Kingdom, BBC WS	21660af	
1500-1600	China, China Radio Intl	7405na	9535na	9785as	11815as			11860af	11940af
1500-1600	Costa Rica, RF Peace Intl	6205am	7385am	15050am				21490af	15420af
1500-1600	Ecuador, HCJB	15115sa	21455va			1500-1600	USA, KAIJ Dallas TX	13815am	15725am
1500-1600 as	Eqt Guinea, R East Africa	15186af				1500-1600	USA, KTNB Salt Lk City UT	15590am	
1500-1600	Guam, TWR/KTWR	11580as				1500-1600	USA, KWHR Naalehu HI	9930as	
1500-1600	Italy, Adv World Radio	7230eu				1500-1600	USA, Monitor Radio Intl	9355as	
1500-1600 vi	Italy, IRRS	3985va				1500-1600	USA, Voice of America	7125as	7215as
1500-1600	Japan, NHK/Radio	9535na	11915as	11930me	15355af			9760as	9645as
1500-1600	Jordan, Radio	11970eu				1500-1600	USA, WEWN Birmingham AL	9580na	9525va
1500-1600	Lebanon, Voice of Hope	6280eu				1500-1600	USA, WGTG McCaysville GA	9400am	15665eu
1500-1600	Malaysia, Radio	7295do				1500-1600	USA, WHRI Noblesville IN	13760am	15105am
1500-1600 vi	Malaysia, RTM Kuching	7160do				1500-1600	USA, WJCR Upton KY	7490na	13595na
1500-1600 vi	Malaysia, RTM Kota Kinabalu	5980do				1500-1600	USA, WRNO New Orleans LA	15420am	
1500-1530	Mexico, Radio Mexico Intl	9705na				1500-1600 as	USA, WVHA Greenbush ME	15745eu	
1500-1530	Mongolia, R Ulan Bator	9745as	12085as			1500-1600	USA, WWCN Nashville TN	12160am	13845am
1500-1515 s	Myanmar, Voice of	5990do				1500-1600	USA, WYFR Okeechobee FL	11830na	17750na
1500-1525	Netherlands, Radio	9895as	13700as	15150as		1500-1600	Zambia, Christian Voice	6065af	
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa				1520-1530 mtwhf	Estonia, Radio	5925eu	
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me	1530-1555	Austria, R Austria Intl	11780as	
1500-1600 vi	Palau, KHBV/Voice of Hope	9955as	9965as	9985as	15140as	1530-1545	India, All India Radio	3945do	6185do
1500-1600	Philippines, FBBC/R Intl	11995as						9530do	7140do
1500-1526	Romania, R Romania Intl	11775as	15335as					965do	9685do
1500-1600	Russia, Voice of Russia WS	4740va	4940va	4975va	7305me	1530-1600	Iran, VOIRI	11740do	9910do
		9595me	9830va	9955af	9975af	1530-1600	Netherlands, Radio	7290as	9635as
		11775va	11835va	11945va	12025af	1530-1600	United Kingdom, BBC WS	9890as	15150as
		12035va	15320me	15340va	15350va	1538-1555 1&3rd s	Denmark, R Denmark Intl	7180as	11720as
		15540me	15560af	17750af		1545-1600 a	Vatican State, Vatican R	11840va	13805va
								9940as	15230va
								11640as	

SELECTED PROGRAMS

Sundays

- 1501 UK, BBC London (south as): Play of the Week. See S 0530.
 1505 UK, BBC London (af): The Art House. See S 0435.
 1505 UK, BBC London (am): From Our Own Correspondent. See S 0330.
 1505 UK, BBC London (as pac/eu): Sports Roundup. See S 0135.
 1510 Japan, Radio: Hello from Tokyo.
 1510 USA, VOA Washington DC (as/me): New Horizons.
 1515 UK, BBC London (as pac): Concert Hall. Classical music concerts.
 1515 UK, BBC London (eu): BBC English. For learners of English.
 1525 UK, BBC London (am): Book Choice. Opening a newly published book.
 1530 UK, BBC London (af): BBC English. See S 1515.
 1530 UK, BBC London (am): Variable Feature. See S 1130.
 1530 UK, BBC London (eu): From Our Own Correspondent. See S 0330.
 1530 USA, VOA Washington DC (me): The Writers' World (monthly).
 1550 UK, BBC London (eu): Variable Feature. See S 1130.

Mondays

- 1500 UK, BBC London (af): John Peel (Alternative). See M 1330.
 1500 UK, BBC London (as pac): East Asia Today. See S 2310.
 1505 UK, BBC London (af): Focus on Africa. Up-to-the-minute reports on the day's events from all over the continent.
 1505 UK, BBC London (am/eu/south as): Sports Roundup. See S 0135.
 1515 UK, BBC London (am): The Greenfield Collection. This classical music program replaces Ray on Record.
 1515 UK, BBC London (eu): BBC English. See S 1515.
 1515 UK, BBC London (south as): Concert Hall. See S 1515.
 1530 Australia, Radio: Innovations.
 1530 UK, BBC London (af): Outlook. See M 1405.
 1530 UK, BBC London (as pac): BBC English. See S 1515.
 1530 UK, BBC London (eu): Omnibus. See M 1130.
 1545 UK, BBC London (as pac): Slow-Speed News. News reports read slowly for listeners who are learning English.
 1555 UK, BBC London (af): Words of Faith. See S 0025.

Tuesdays

- 1500 UK, BBC London (af): Multitrack Hit-List (Alternative). See M 1615.
 1500 UK, BBC London (as pac): East Asia Today. See S 2310.
 1505 UK, BBC London (af): Focus on Africa. See M 1505.
 1505 UK, BBC London (am/eu/south as): Sports Roundup. See S 0135.
 1515 UK, BBC London (am): Variable Feature. See S 1130.
 1515 UK, BBC London (eu): BBC English. See S 1515.

- 1515 UK, BBC London (south as): The Greenfield Collection. See M 1515.
 1516 Romania, Radio Romania Intl: Youth Club.
 1525 UK, BBC London (am): Pop Short. See S 0355.
 1530 UK, BBC London (af): Outlook. See M 1405.
 1530 UK, BBC London (am): Youth. Pop Science. NEW! Janice Long returns to answer questions about science, medicine, and technology.
 1530 UK, BBC London (as pac): BBC English. See S 1515.
 1530 UK, BBC London (eu): The Learning World. See S 1130.
 1545 UK, BBC London (as pac): Slow-Speed News. See M 1545.
 1545 UK, BBC London (eu): Youth. Your Questions of Faith. See T 1145.
 1555 UK, BBC London (af): Words of Faith. See S 0025.

Wednesdays

- 1500 UK, BBC London (af): Megamix (Alternative). See T 1615.
 1500 UK, BBC London (as pac): East Asia Today. See S 2310.
 1505 UK, BBC London (af): Focus on Africa. See M 1505.
 1505 UK, BBC London (am/eu/south as): Sports Roundup. See S 0135.
 1505 UK, BBC London (as pac): BBC English. See S 1515.
 1515 UK, BBC London (am): Variable Feature. See S 1130.
 1515 UK, BBC London (eu): BBC English. See S 1515.
 1515 UK, BBC London (south as): From Our Own Correspondent. See S 0330.
 1525 Japan, Radio: History and Classics.
 1530 Australia, Radio: Science File.
 1530 UK, BBC London (af): Outlook. See M 1405.
 1530 UK, BBC London (am): Popular Music. Rock Salad. Tommy Vance plays the very best in new and classic loud guitar music.
 1530 UK, BBC London (eu): Variable Feature. See S 1130.
 1530 UK, BBC London (south as): Meridian On Screen. See T 1615.
 1545 UK, BBC London (as pac): Slow-Speed News. See M 1545.
 1554 Radio Netherlands: Documentary. Living on the Land — Part 3 (7th). See W 1154.
 1554 Radio Netherlands: Documentary. Wake of the Half Moon — Part 1 (14th). See A 2354.
 1554 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (21st). See F 1454.
 1554 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (28th). See F 2354.
 1555 UK, BBC London (af): Words of Faith. See S 0025.

Thursdays

- 1500 UK, BBC London (af): Multitrack X-Press (Alternative). See W 1615.

- 1500 UK, BBC London (as pac): East Asia Today. See S 2310.
 1505 UK, BBC London (af): Focus on Africa. See M 1505.
 1505 UK, BBC London (am/eu/south as): Sports Roundup. See S 0135.
 1515 UK, BBC London (am): The Farming World. See S 1445.
 1515 UK, BBC London (eu): BBC English. See S 1515.
 1515 UK, BBC London (south as): Assignment. See H 0230.
 1530 UK, BBC London (af): Outlook. See M 1405.
 1530 UK, BBC London (am): Megamix. See T 1615.
 1530 UK, BBC London (as pac): BBC English. See S 1515.
 1530 UK, BBC London (eu): Network UK. See H 1430.
 1545 UK, BBC London (as pac): Slow-Speed News. See M 1545.
 1545 UK, BBC London (south as): The Learning World. See S 1130.
 1555 UK, BBC London (af): Words of Faith. See S 0025.

Fridays

- 1500 UK, BBC London (af): Multitrack Alternative (Alternative). See F 1330.
 1500 UK, BBC London (as pac): East Asia Today. See S 2310.
 1505 UK, BBC London (af): Focus on Africa. See M 1505.
 1505 UK, BBC London (as pac): BBC English. See S 1515.
 1505 UK, BBC London (eu/south as): Sports Roundup. See S 0135.
 1515 UK, BBC London (am): Concert Hall. See S 1515.
 1515 UK, BBC London (eu): BBC English. See S 1515.
 1515 UK, BBC London (south as): Variable Feature. See S 1130.
 1530 UK, BBC London (af): Outlook. See M 1405.
 1530 UK, BBC London (eu): Music Review. See S 0230.
 1530 USA, VOA Washington DC (as/me): Country Music USA.
 1545 UK, BBC London (as pac): Slow-Speed News. See M 1545.
 1545 UK, BBC London (south as): Seeing Stars (1). See S 0430.
 1545 UK, BBC London (south as): Short Story. See S 0430.
 1555 UK, BBC London (af): Words of Faith. See S 0025.

Saturdays

- 1505 UK, BBC London (af/am/as pac/eu/south as): Sportsworld. See A 1405.
 1513 Romania, Radio Romania Intl: Bucharest Along the Centuries.
 1519 Romania, Radio Romania Intl: Radio Romania DX Mailbag.
 1530 USA, VOA Washington DC (as/me): Press Conference USA.



FREQUENCIES

1600-1700	Australia, Radio	5995pa 7260as 11695pa	6060pa 9580pa 11800pa	6080pa 9615va 11660pa	6090pa	1600-1700	South Korea, R Korea Intl	5975eu 9720as 9500af	9515af 15425as	9870af
1600-1609	Belarus, Radiosta Belarus	4880eu				1600-1630 mtwhf	Sri Lanka, Sri Lanka BC	11795me	13675eu	15395me
1600-1700 vl	Canada, CBC N Quebec Svc	9625do				1600-1700	Swaziland, Trans World R	3915as	6190af	6195va
1600-1700	Canada, CFCX Montreal	6005do				1630-1640	UAE, Radio Dubai	9410va	9515na	9590na
1600-1700	Canada, CFRX Toronto	6070do				1600-1700	United Kingdom, BBC WS	11750as	12095as	15070as
1600-1700	Canada, CFVP Calgary	6030do						17830af	17840va	21470af
1600-1700	Canada, CHNX Halifax	6130do				1600-1615	United Kingdom, BBC WS	5990as	7180as	7205as
1600-1700	Canada, CKZN St John's	6160do				1600-1700	USA, KAIJ Dallas TX	13815am	15725am	
1600-1700	Canada, CKZU Vancouver	6160do				1600-1700	USA, KTVN Salt Lk City UT	15590am		
1600-1700	China, China Radio Intl	4130af	11575as	15110af	15130af	1600-1700	USA, KWHR Naalehu HI	6120as		
1600-1700	Costa Rica, RF Peace Intl	6205am	15050am			1600-1700	USA, Monitor Radio Intl	9385af	15715eu	17510af
1600-1627	Czech Rep, Radio Prague	5930eu	17485af			1600-1700	USA, Voice of America	7125as	7215as	9645as
1600-1630	Ethiopia, Radio	7165af						11920af	12040af	13710af
1600-1700	France, Radio France Intl	6175eu	11615me	11700af	12015af			15225af	15255va	15395as
		15210af	15460af	15530af				15445af	17895af	15410af
1600-1650	Germany, Deutsche Welle	7225as	9875as	13690as		1600-1630 as	USA, Voice of America	6035af		
1600-1700	Germany, Deutsche Welle	7185af	9735af	11965af	17800af	1600-1700	USA, WEWN Birmingham AL	11875na	13615na	15665eu
1600-1700	Guam, AWR/KSDA	7395as				1600-1700	USA, WGTG McCaysville GA	9400am		
1600-1615 mt	Guam, TWR/KTWR	11580as				1600-1700	USA, WHRI Noblesville IN	13760am	15105am	
1600-1630 whfas	Guam, TWR/KTWR	11580as				1600-1700	USA, WJCR Upton KY	7490na	13595na	
1600-1630	Iran, VOIRI	7290as	9635as			1600-1700	USA, WRNO New Orleans LA	15420am		
1600-1700 vl	Italy, IRRS	3985va				1600-1700 as	USA, WVHA Greenbush ME	15745eu		
1600-1630	Jordan, Radio	11970eu				1600-1700	USA, WWCR Nashville TN	9475am	12160am	13845am
1600-1700	Malaysia, Radio	7295do				1600-1700	USA, WYFR Okeechobee FL	11705na	11830na	15695eu
1600-1625	Netherlands, Radio	9895as	13700as	15150as				21525af	21745eu	
1600-1650 occsnal	New Zealand, R NZ Intl	6100am				1600-1620 a	Vatican State, Vatican R	5880as	7250as	
1600-1630 s	Norway, Radio Norway Intl	11860eu	13800eu			1600-1700	Zambia, Christian Voice	3330af		
1600-1630	Pakistan, Radio	9425af	9515af	11570af	13590af	1600-1610 mtwhfa	Zambia, ZNBC Radio 2	6165do		
		15555af				1615-1630	Albania, R Tirana Intl	7155eu	9740eu	
1600-1700 vl	Palau, KHBN/Voice of Hope	9955as	9965as	9985as		1615-1700	United Kingdom, BBC WS	9510as	11860af	
1600-1700	Russia, Voice of Russia WS	7240eu	7325af	7350eu	7440af	1615-1630 a	Vatican State, Vatican R	9645eu	11810eu	
		9480eu	9830va	9880eu	9955eu	1630-1659	Canada, R Canada Intl	7150as	9550as	
		9975eu	11630eu	11675eu	11775me	1630-1700	Egypt, Radio Cairo	15255af		
		11945me	12025af	15350va	15400eu	1630-1700	Slovakia, Adv World Radio	15620af		
		17875af				1630-1700	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu
1600-1655	S Africa, Channel Africa	9530af				1630-1700	USA, Voice of America	11765af		
1600-1700	S Africa, Trans World R	9500af				1638-1655 1&3rd s	Denmark, R Denmark Intl	11860na	13800na	15540na
1600-1700	Singapore, SBC Radio One	6155do				1645-1700 mtwhf	Canada, R Canada Intl	9555va	11935va	15325eu
1600-1700	Slovakia, Adv World Radio	13590as				1650-1700	Eq Guinea, Radio Africa	15186af		17820eu
						1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa		

SELECTED PROGRAMS

Sundays

- 1600 UK, BBC London (eu): Europe Today. All the latest news, analysis and comment.
- 1610 USA, VOA Washington DC (as/me): Encounter.
- 1615 UK, BBC London (af/am): Variable Comedy/Quiz Feature. See S 1401.
- 1615 UK, BBC London (as pac): In Praise of God. See S 0230.
- 1615 UK, BBC London (south as): Letter from America. See S 0030.
- 1630 UK, BBC London (eu): Play of the Week. See S 0530.
- 1630 UK, BBC London (south as): Education. Legal Rights, Legal Wrongs. See M 1215.
- 1634 Germany, Deutsche Welle: Hits in Germany.
- 1645 UK, BBC London (af/south as): Variable Feature. See S 1130.
- 1645 UK, BBC London (am): Britain Today. See S 0045.
- 1645 UK, BBC London (as pac): Seeing Stars (1). See S 0430.
- 1645 UK, BBC London (as pac): Short Story. See S 0430.

Mondays

- 1600 UK, BBC London (eu): Europe Today. See S 1600.
- 1604 Jordan, Radio: On the Air if You Dare.
- 1606 USA, WRNO New Orleans LA: Rush Limbaugh Program (M-F).
- 1615 UK, BBC London (af): Fast Track. The latest African sports news and action.
- 1615 UK, BBC London (am): Meridian. See S 0630.
- 1615 UK, BBC London (as pac): Multitrack Hit-List. The UK Top 20.
- 1615 UK, BBC London (south as): Omnibus. See M 1130.
- 1630 UK, BBC London (eu): World Business Report. See M 1205.
- 1635 USA, WWCR #3 Nashville TN: World Wide Country Radio (live) (M-F).
- 1639 Russia, Voice of: Science and Engineering in the CIS (M-W).
- 1643 Germany, Deutsche Welle: Science and Technology.
- 1645 UK, BBC London (af): The World Today. Examines thoroughly a topical aspect of the international scene.
- 1645 UK, BBC London (am/as pac/eu/south as): Britain Today. See S 0045.

Tuesdays

- 1600 UK, BBC London (eu): Europe Today. See S 1600.
- 1615 UK, BBC London (af): Money Focus. African business magazine.
- 1615 UK, BBC London (am): Meridian On Screen. The latest cinematic offerings are discussed.
- 1615 UK, BBC London (as pac/south as): Megamix. A youth magazine series which covers new trends, entertainment, sport and other issues.
- 1630 UK, BBC London (eu): World Business Report. See M 1205.
- 1645 UK, BBC London (af/am/as pac/eu): The World Today. See M 1645.
- 1645 UK, BBC London (south as): The World Today. See M 1645.

Wednesdays

- 1600 UK, BBC London (eu): Europe Today. See S 1600.
- 1615 UK, BBC London (af): Talkabout Africa. Telephone conversations with BBC correspondents on late-breaking African events.
- 1615 UK, BBC London (am): Meridian. See S 0630.
- 1615 UK, BBC London (as pac): Multitrack X-Press. New pop records, interviews, news and competitions.
- 1615 UK, BBC London (south as): Youth. Pop Science. See T 1530.
- 1630 UK, BBC London (eu): World Business Report. See M 1205.
- 1645 UK, BBC London (af): The World Today. See M 1645.
- 1645 UK, BBC London (am/as pac/eu/south as): Britain Today. See S 0045.

Thursdays

- 1600 UK, BBC London (eu): Europe Today. See S 1600.
- 1605 Jordan, Radio: Radio Jordan's Top 20.
- 1611 Russia, Voice of: Moscow Mailbag.
- 1615 UK, BBC London (af): Jive Zone. Get in the groove with all the latest sounds on the Afro music scene.
- 1615 UK, BBC London (am/as pac): Sports International. See H 0630.
- 1615 UK, BBC London (south as): Network UK. See H 1430.

- 1630 UK, BBC London (eu): World Business Report. See M 1205.
- 1643 Germany, Deutsche Welle: Living in Germany.
- 1645 UK, BBC London (af): The World Today. See M 1645.
- 1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
- 1645 UK, BBC London (south as): The World Today. See M 1645.

Fridays

- 1600 UK, BBC London (eu): Europe Today. See S 1600.
- 1604 Jordan, Radio: Country Music.
- 1615 UK, BBC London (af): African Perspective. See S 0631.
- 1615 UK, BBC London (am): Meridian. See S 0630.
- 1615 UK, BBC London (as pac): Multitrack Alternative. See F 1330.
- 1615 UK, BBC London (south as): Science in Action. See S 0430.
- 1630 UK, BBC London (eu): World Business Report. See M 1205.
- 1630 USA, VOA Washington DC (af): NAfrica World Tonight.
- 1632 Russia, Voice of: Your Top Tune.
- 1645 UK, BBC London (af): The World Today. See M 1645.
- 1645 UK, BBC London (am/as pac/eu): Britain Today. See S 0045.
- 1645 UK, BBC London (south as): The World Today. See M 1645.
- 1647 Russia, Voice of: You Write to Moscow.

Saturdays

- 1600 USA, VOA Washington DC (af): Nightline Africa.
- 1600 USA, WWCR #4 Nashville TN: World of Radio.
- 1605 USA, WWCR #3 Nashville TN: Ham Radio and More.
- 1610 USA, VOA Washington DC (as/me): On the Line.
- 1615 UK, BBC London (af/am/as pac/eu/south as): Sportsworld. See A 1405.
- 1630 USA, WWCR #4 Nashville TN: Ken's Country Classics.

FREQUENCIES

1700-1800	Australia, Radio	6060pa 9580pa 11695pa	6080pa 9615as 11880pa	6090pa 9860pa	7260as 11660pa	1800-1900	Algeria, R Algiers Intl	11715me	15160eu	15205eu	7260eu
1700-1800 vl	Canada, CBC N Quebec Svc	9625do				1800-1900	Australia, Radio	6060pa 9580pa 11880pa	6080pa 9860pa	6090pa 11660as	7260eu 11695pa
1700-1800	Canada, CFCX Montreal	6005do				1800-1900	Bangladesh, Radio	7190eu	9568as	15520as	
1700-1800	Canada, CFRX Toronto	6070do				1800-1825	Belgium, R Vlaanderen Int	5910eu	13645af		
1700-1800	Canada, CFVP Calgary	6030do				1800-1900	Brazil, Radio Bras	15265eu			
1700-1800	Canada, CHNX Halifax	6130do				1800-1900	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CKZN St John's	6160do				1800-1900	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CKZU Vancouver	6160do				1800-1900	Canada, CFVP Calgary	6030do			
1700-1800	China, China Radio Intl	5220af 11575af	7150af 11910af	7405af	9535as	1800-1900	Canada, CHNX Halifax	6130do			
1700-1800 as	Costa Rica, Adv World R	13750am				1800-1900	Canada, CKZN St John's	6160do			
1700-1800	Costa Rica, RF Peace Intl	6205am	15050am			1800-1900	Canada, CKZU Vancouver	6160do			
1700-1727	Czech Rep, Radio Prague	5835eu	15640af			1800-1900	Costa Rica, RF Peace Intl	6205am	15050am		
1700-1800	Ecuador, HCJB	15540eu	21455eu			1800-1900	Ecuador, HCJB	15550eu			
1700-1800	Egypt, Radio Cairo	15255af				1800-1830	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af				1800-1900	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	6175eu 15210af	11615me 15365af	11700af 15460af	12015af 15530af	1800-1900	India, All India Radio	7410eu 11935me	9650eu 13750as	9950af 15075as	11620af
1700-1800 vl	Italy, IRRS	3985va				1800-1900 vl	Italy, IRRS	3985va			
1700-1800	Japan, NHK/Radio	6035na	9535na	9580as	11880as	1800-1900	Kuwait, Radio	11990na			
1700-1800	Lebanon, Voice of Hope	6280eu				1800-1830 mtwhf	Lebanon, Voice of Hope	6550eu			
1700-1800 mtwhf	New Zealand, R NZ Intl	6145pa				1800-1900	Lebanon, Voice of Hope	6280eu	9960me		
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me	1800-1900 s	Morocco, RTVM Marocaine	17815af			
1700-1750	Pakistan, Radio	9400eu	11570eu			1800-1825	Netherlands, Radio	6020af	7120af	11655af	
1700-1800 vl	Palau, KHBV/Voice of Hope	9955as	9965as	9985as		1800-1900 mtwhf	New Zealand, R NZ Intl	6145pa			
1700-1755	Poland, Polish R Warsaw	6095eu	7270eu	7285eu		1800-1830 s	Norway, Radio Norway Intl	7485af	9590af	13805af	15220af
1700-1800	Russia, Voice of Russia WS	7440af 9955af	9480eu 9975af	9830va 11775va	9880eu 11960va	1800-1900	Russia, Voice of Russia WS	7240eu 9665va 11675eu	7350eu 9880va 11945af	9480eu 9955af 11960af	9505va 9975af 11630af
1700-1755	S Africa, Channel Africa	3220af	7155af			1800-1900	Sudan, Radio Omdurman	9026af			
1700-1730	Sri Lanka, Sri Lanka BC	15425as				1800-1830	Swaziland, Trans World R	9500af			
1700-1800	Swaziland, Trans World R	9500af				1800-1900	Swaziland, Trans World R	3200af			
1700-1730	Switzerland, Swiss R Intl	9505eu 13635af	9885me	9905eu	12075af	1800-1900	United Kingdom, BBC WS	3255af	3955eu	6180eu	6190af
1700-1800	United Kingdom, BBC WS	3955eu 9410va 11760as	6190af 9710as 11860af	6195eu 9740as 15070af	7150eu 11750as 15400af	1800-1830	United Kingdom, BBC WS	6195eu 15400af	9410va 17830af	12095eu 17840ca	15070af
1700-1745	United Kingdom, BBC WS	15420af	17830af	17840af		1800-1900	USA, KAIJ Dallas TX	13815am			
1700-1715	United Kingdom, BBC WS	3915as	7135as	9630af	12095va	1800-1900	USA, KJES Mesquite NM	15385na			
1700-1800	USA, KAIJ Dallas TX	9515va	9590na			1800-1900	USA, KTNB Salt Lk City UT	15590am			
1700-1800	USA, KTNB Salt Lk City UT	13815am	15725am			1800-1900	USA, KWHR Naalehu HI	13625au			
1700-1800	USA, KWHR Naalehu HI	15590am				1800-1900	USA, Monitor Radio Intl	9385af	13770me	15665eu	17510af
1700-1800	USA, Monitor Radio Intl	6120as	15715eu	17510af		1800-1900	USA, Voice of America	6035va	9760va	9770va	11920af
1700-1800	USA, Voice of America	9385af	7125as	7215as	9645as	1800-1830	USA, Voice of America	12040af	15410af	15580af	15665af
1700-1800	USA, Voice of America	6035as	11920af	12040af	13710af	1800-1900	USA, WEWN Birmingham AL	11765af			
1700-1800 mtwhf	USA, Voice of America	9700va 15255va	9760va 15395as	11765af 15410af	13710af 15665eu	1800-1900	USA, WGTG McCaysville GA	11875na	13615na	15745eu	
1700-1800	USA, WEWN Birmingham AL	9400am				1800-1900	USA, WJCR Upton KY	9495am	13760eu	13595na	
1700-1800	USA, WGTG McCaysville GA	13760am	15105ca			1800-1900	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, WHRI Noblesville IN	7490na	13595na			1800-1900 mtwhf	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WJCR Upton KY	9465eu				1800-1900	USA, WRNO New Orleans LA	15420am			
1700-1800 smtwhf	USA, WMLK Bethel PA	15420am				1800-1900	USA, WVHA Greenbush ME	9930af			
1700-1800	USA, WRNO New Orleans LA	9475am	12160am	13845am	15685am	1800-1900	USA, WWCN Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WWCN Nashville TN	15695eu	17555eu			1800-1900	USA, WYFR Okeechobee FL	15695eu	17555eu		
1700-1800	USA, WYFR Okeechobee FL	3330af				1800-1900	Zambia, Christian Voice	3330af			
1700-1800 a	Zambia, Christian Voice	6165do				1800-1810	Zambia, ZNBC Radio 1	7220do			
1700-1800 vl	Zambia, ZNBC Radio 2	4828do				1800-1857	Zambia, ZNBC Radio 2	6165do			
1715-1800	United Kingdom, BBC WS	7160va				1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1730-1755	Austria, R Austria Intl	6155eu	9665me	11780as	13730eu	1803-1810	Croatia, Croatian Radio	5920eu	7165eu	9830eu	
1730-1800	Guam, AWR/KSDA	9370as				1830-1900	Albania, R Tirana Intl	7270eu	9740eu		
1730-1800	Netherlands, Radio	6020af	7120af	11655af		1830-1900	Netherlands, Radio	6020af	7120af	9860af	11655af
1730-1756	Romania, R Romania Intl	9550af	9750af	11830af	11940af	1830-1857	S Africa, Trans World R	13700af	15315af	17605af	
1730-1800	United Kingdom, BBC WS	6180eu				1830-1900	Serbia, Radio Yugoslavia	9525af			
1730-1800	Vatican State, Vatican R	9660af	11625af	15570af		1830-1900	Slovakia, R Slovakia Intl	6100eu	9720eu		
1738-1755 1&3rd s	Denmark, R Denmark Intl	7485va	11860va	15220va		1830-1855 irreg	Somalia, Radio Mogadishu	5915eu	6055eu	7345eu	
1745-1800 mtwhf	Armenia, Voice of	4810eu	4990eu	7490eu	9965eu	1830-1900	South Korea, R Korea Intl	6710af			
1745-1800	Bangladesh, Radio	7190as	9568as			1830-1900	Sweden, Radio	3955eu	9655eu	11615me	
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af	1830-1900	Turkey, Voice of	6065eu	9535na		
		11935af	13750as	15075me		1830-1900	United Kingdom, BBC WS	9445na	9630af	9740va	
1745-1800 mtwhf	Swaziland, Trans World R	3200af				1830-1900	USA, Voice of America	12080af			
						1833-1900	Cote D' Ivoire, RDTV	11920do			
						1838-1855 1&3rd s	Denmark, R Denmark Intl	7485eu	9590eu	13805va	15220va
						1840-1850	Greece, Voice of	11645af	15150af		
						1845-1900 t	Belarus, Radiosta Belarus	7180eu	7210eu	9875eu	11960eu
						1845-1900 irreg s	Mali, RDTV Maliene	4783do	4835do	5995do	

HAUSER'S HIGHLIGHTS (continued from p. 59)

The Big Backyard Sat 1730 12160, Mon 0400 3215
Spiritual Awakening M-F 1510 15685
View from Europe Fri 2110 15685, Fri 2210 9475,
Sat 1110 15685
President & Republicans Sat 1945 15685, 2300 9475
Golden Age of Radio Sun 0605 7435
Worldwide Country Radio M-F 1635-1800, 1815-1830,
2000-2100 12160
Nashville Songwriters Sun 2300 7435

Great American Polka Mon 2100 12160, Sat 1400 12160
America's Jukebox Gold Fri 2100 12160, Sun 1200 9475
News from RTE Ireland M-F 1830, Sat 1900, Sun 2000 on
12160; M-F 0900, Sat/Sun 1000 5065
Angel Too Record/ Sat 0530-0630 5065, Sat 2000 9475
Country Crazy Showcase
Opry North/Ted's Boys Sun 0800 5065
Extraordinary Science Sun 0300 2390, Mon 0400 5065
(WWCR June online guide via Thurman, updated by Adam Lock)

FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345eu				2000-2100	Algeria, R Algiers Intl	11715me	15160eu		
1900-2000	Australia, Radio	6060pa	6080pa	6150as	7240pa	2000-2100	Angola, Radio Nacional	3355do	9535do		
		7260as	9560as	9580pa	9860pa	2000-2100	Australia, Radio	6060pa	6080pa	6150pa	7260as
		11660pa	11695pa	11880pa			9580pa	11660pa	11695pa	11855as	11880pa
							12080pa				
1900-1930	Azerbaijan, Voice of	4957eu				2000-2100	Canada, CFCX Montreal	6005do			
1900-1920	Brazil, Radio Bras	15265eu				2000-2100	Canada, CFRX Toronto	6070do			
1900-2000	Bulgaria, Radio	9700eu	11720eu			2000-2100	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CFCX Montreal	6005do				2000-2100	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CFRX Toronto	6070do				2000-2100	Canada, CKZN St John's	6160do			
1900-2000	Canada, CFVP Calgary	6030do				2000-2100	Canada, CKZU Vancouver	6160do			
1900-2000	Canada, CHNX Halifax	6130do				2000-2059	Canada, R Canada Intl	5995va	7235va	11690va	13650eu
1900-2000	Canada, CKZN St John's	6160do						13670eu	15150eu	15325eu	17820eu
1900-2000	Canada, CKZU Vancouver	6160do						17870eu			
1900-2000	China, China Radio Intl	6955af	9440af	11515me		2000-2100	China, China Radio Intl	5220eu	6950eu	9440af	9920eu
1900-2000	Costa Rica, Adv World R	13750am	15460am					11715af	15110af		
1900-2000	Costa Rica, RF Peace Intl	6205am	15050am			2000-2100	Costa Rica, RF Peace Intl	6205am	15050am		
1900-1930	Cote D' Ivoire, RDTV	11920do				2000-2027	Czech Rep., Radio Prague	5930va	11600va		
1900-2000	Ecuador, HCJB	15550eu				2000-2100	Ecuador, HCJB	15550eu			
1900-2000	Egt Guinea, Radio Africa	15186af				2000-2100	Egt Guinea, Radio Africa	15186af			
1900-1930 mt	Estonia, Radio	5925eu				2000-2050	Germany, Deutsche Welle	7170eu	9615eu		
1900-1950	Germany, Deutsche Welle	9735af	11740af	11785af	13690af	2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
		13790af				2000-2010	Greece, Voice of	9420eu			
		5980am				2000-2100	Guatemala, Adv World R	5980am			
1900-2000	Guatemala, Adv World R	5980am				2000-2100	Indonesia, Voice of	9525as			
1900-1930	Hungary, Radio Budapest	3975eu	6140eu	7130eu	9835eu	2000-2030	Iran, VOIRI	7260af	9022eu		
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu	2000-2100 vi/fas	Italy, IRRS	3980va			
		11935af	13750as	15075as		2000-2100 vi	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
		7465na	9435eu	11605na	15640sa	2000-2100	Kuwait, Radio	11990eu			
1900-1930	Israel, Kol Israel	3985va				2000-2100	Lebanon, Voice of Hope	9960eu			
1900-2000 vi	Italy, IRRS	3985va				2000-2030 vi	Mexico, Radio Mexico Intl	9705na			
1900-2000	Japan, NHK/Radio	6035as	7140pa	9535na	9580as	2000-2025	Netherlands, Radio	7120af	7205af	7895af	9860af
1900-2000 vi	Kenya, Kenya Broadc Corp	4885do	4935do	6150do				11655af	15315af	17605af	
1900-2000	Kuwait, Radio	11990eu				2000-2006 fa	New Zealand, R NZ Intl	9810pa			
1900-1930 as	Latvia, Radio	5935eu				2000-2048 smtwh	New Zealand, R NZ Intl	9810pa			
1900-2000	Lebanon, Voice of Hope	6280eu	9960me			2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
1900-1930 vi	Mexico, Radio Mexico Intl	9705na				2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
1900-2000	Netherlands, Radio	6020af	7120af	9860af	9895af	2000-2030 s	Norway, Radio Norway Intl	9590au			
		11655af	13700af	15315af	17605af	2000-2100 vi	Papua New Guinea, NBC	4890do			
1900-1952 mtwhf	New Zealand, R NZ Intl	6145pa				2000-2025	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
1900-1956	Romania, R Romania Intl	9550eu	9690eu	11810eu	11940eu	2000-2030 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	15515af
1900-2000	Russia, Voice of Russia WS	7440af	9480eu	9665eu	11630af	2000-2100	Russia, Voice of Russia WS	7070eu	9480eu	9880eu	11630eu
		11675eu	11765af	11785af	11945af			11675eu			
		17875af				2000-2015	Sierra Leone, SLBS	3316do			
		5975eu	7275as			2000-2015	Swaziland, Trans World R	3200af			
1900-2000	South Korea, R Korea Intl	5975eu				2000-2030	Switzerland, Swiss R Intl	6165eu	9870af	9885af	9905af
1900-2000	Swaziland, Trans World R	3200af						11640af			
1900-1930	Switzerland, Swiss R Intl	6165eu				2000-2015	Uganda, Radio	3340do			
1900-2000	Thailand, Radio	7210eu				2000-2100	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
1900-1930	Turkey, Voice of	9445na	9535na	5975me	6005af			6180eu	7325eu	9410af	9630af
1900-2000	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af			11750sa	11835va	11955as	12095eu
		6180eu	6190af	6195va	9410af			17830af		15070eu	15400af
		9630af	9740af	15070va	15400af						
		17830af				2000-2100	USA, KAIJ Dallas TX	13815am	15725na		
1900-2000	USA, KAIJ Dallas TX	13815af	15725am			2000-2100	USA, KATN Salt Lk City UT	15590am			
1900-2000	USA, KATN Salt Lk City UT	15590am				2000-2100 s	USA, KVOH Los Angeles CA	17775am			
1900-2000	USA, KWHR Naalehu HI	13625au				2000-2100	USA, KWHR Naalehu HI	15405as			
1900-2000	USA, Monitor Radio Intl	9385af	13770me	15665eu	17510af	2000-2100	USA, Monitor Radio Intl	9845pa	13770eu	15665eu	
1900-2000	USA, Voice of America	6035af	7415af	9525va	9760va	2000-2100	USA, Voice of America	6035af	7415af	9760va	9770va
		9770va	11870va	11920af	12040af			12080af	15410af	15580af	17725af
		12080af	13710af	15180va	15410af			17755af			
		15445af	15580af			2000-2100	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
1900-2000	USA, WEWN Birmingham AL	11875na	13615na	15745eu		2000-2100	USA, WGTG McCaysville GA	9400am			
1900-2000	USA, WGTG McCaysville GA	9400am				2000-2100	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu			2000-2100	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WJCR Upton KY	7490na	13595na			2000-2100	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WMLK Bethel PA	9465eu				2000-2100 mtwhf	USA, WRMI/R Miami Intl	9955am			
1900-2000 mtwhf	USA, WRMI/R Miami Intl	9955am				2000-2100 as	USA, WVHA Greenbush ME	9930af			
1900-2000	USA, WRNO New Orleans LA	15420am				2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-2000 smtwhf	USA, WVHA Greenbush ME	9930af				2000-2100	USA, WYFR Okeechobee FL	17555eu	17750eu	21525af	
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am	2000-2030	Vatican State, Vatican R	7365eu	9645eu	11625eu	
1900-2000	USA, WYFR Okeechobee FL	17555eu	21745eu			2000-2100	Zambia, Christian Voice	3330af			
1900-2000	Zambia, Christian Voice	3330af				2000-2005	Zambia, ZNBC Radio 2	6165do			
1900-2000 vi	Zimbabwe, Zimbabwe BC	4828do				2000-2100 vi	Zimbabwe, Zimbabwe BC	4828do			
1930-1955	Austria, R Austria Intl	9655me	13730af			2005-2100	Syria, Radio Damascus	12085na	15095na		
1930-2000	Iran, VOIRI	7260af	9022eu			2007-2300 fa	New Zealand, R NZ Intl	11735pa			
1930-2000	Mongolia, R Ulan Bator	9745as	12085as			2015-2045 as	Swaziland, Trans World R	3200af			
1930-2000 vi	Papua New Guinea, NBC	4890do					Italy, RAI Intl	7110af	9710af	11840af	
1930-2000	Poland, Polish R Warsaw	6035eu	6095eu	7285eu		2030-2100	Armenia, Voice of	9965eu	11615eu	11665eu	
1930-2000	Sweden, Radio	6065eu				2030-2100	Egypt, Radio Cairo	15375af			
1935-1955	Italy, RAI Intl	9670eu	9710eu	11905eu		2030-2100	Finland, YLE/R Finland	9855af	15440af		
1938-1955 1&3rd s	Denmark, R Denmark Intl	7520af	11860af	13805eu	15220au	2030-2035 mtwhf	Latvia, Radio	5935eu			
1950-2000	Vatican State, Vatican R	4005eu	5880eu	7250eu		2030-2100 mwh	Moldova, R Dniester Intl	11750na			
1953-2000 smtwh	New Zealand, R NZ Intl	9810pa				2030-2100	Netherlands, Radio	9860af	9895af	11655af	
						2030-2100	Russia, Voice of Russia WS	7240eu	9665af		
						2030-2100	Serbia, Radio Yugoslavia	7230au			
						2030-2100	Slovakia, Adv World Radio	9455af			
						2030-2100 as	Sweden, Radio	6065eu	9430eu	9655af	
						2030-2045	Thailand, Radio	9555eu			
						2038-2055 1&3rd s	Denmark, R Denmark Intl	7485eu	9590me		
						2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
								11715pa	15225pa		
						2049-2100 smtwh	New Zealand, R NZ Intl	11735pa			

FREQUENCIES

2100-2200	Australia, Radio	6060pa 9580pa 11880pa	6080pa 9660pa 11955pa	7240pa 11660pa 13745pa	7260as 11855as
2100-2110	Bahrain, Radio	6010do			
2100-2125	Belgium, R Vlaanderen Int	5910na			
2100-2200	Bulgaria, Radio	9700eu	11720eu		
2100-2200 vl	Cameroon, Radio Garoua	5010do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2200	Canada, R Canada Intl	7235eu 15150eu	11690eu 15325eu	13650eu 17820eu	13670eu
2100-2200	China, China Radio Intl	5220eu	6950eu	9920eu	
2100-2130	China, China Radio Intl	3985eu	11715af	15110af	
2100-2200	Costa Rica, RF Peace Intl	6205am	15050am		
2100-2200	Cuba, Radio Havana	13715eu	13715eu		
2100-2200	Ecuador, HCJB	15550eu	21455eu		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	7115as 11755af	9670as 15135af	9735af	9765as
2100-2130	Hungary, Radio Budapest	3975eu	5935eu	7250eu	9835eu
2100-2200	India, All India Radio	7410eu 11715au	9910eu 15225au	9950eu	11620au
2100-2200 vl/fas	Italy, IRRS	3980va			
2100-2200	Japan, NHK/Radio	6035as	9535as	9560as	11850pa
2100-2110	Japan, NHK/Radio	9570as	11685as		
2100-2105 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	6280eu	9960me		
2100-2125	Netherlands, Radio	9860af	9895af	11655af	
2100-2200 smtwh	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2156	Romania, R Romania Intl	5990eu	7105eu	7195eu	9690eu
2100-2200	Russia, Voice of Russia WS	7240eu 9665eu 11750eu	7350eu 9710eu	9480eu 9880eu	9580eu 11630eu
2100-2130	Serbia, Radio Yugoslavia	6100eu	6185eu		
2100-2200	Slovakia, Adv World Radio	6055eu			
2100-2130	Slovakia, Adv World Radio	9455af			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2157	Spain, R Exterior Espana	6125eu	11775af		
2100-2110	Uganda, Radio	3340do			
2100-2200	Ukraine, R Ukraine Intl	5905eu 9560eu	6010eu 9735eu	6020eu 9875eu	6080eu
2100-2200	United Kingdom, BBC WS	3255af 6005af 6195va 11750sa 15070eu	3915as 6120as 7325eu 11835va	3955eu 6180eu 9410va 11955as	5975va 6190af 9740au 12095eu
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am	15725am		
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, Monitor Radio Intl	13770na	13840au	15665eu	
2100-2200	USA, Voice of America	6035af 11965va 15445af 11855af	7415af 13710af 15580af 12080af	9760na 15185va 17725af	11870na 15410af
2100-2130	USA, Voice of America	11855af	12080af		
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200	USA, WRMI/R Miami Intl	9955am			
2100-2200 mtwhf	USA, WVHA Greenbush ME	9930eu			
2100-2200 s	USA, WVHA Greenbush ME	9930af			
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2100-2200	USA, WYFR Okeechobee FL	17555eu	17845eu	21525af	
2100-2200	Zambia, Christian Voice	3330af			
2100-2105	Zambia, ZNBC Radio 2	6165do			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2103-2110	Croatia, Croatian Radio	5895eu	7165eu		
2105-2200	Syria, Radio Damascus	12085na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	15390am	17715am		
2130-2200	Australia, Radio	9610as 17860pa	9645as	15365pa	17795pa
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6175au			

2130-2200	Russia, Voice of Russia WS	7250eu		
2130-2200	Sweden, Radio	6065eu	9430na	9655va
2130-2145	United Kingdom, BBC WS	11680sa		
2138-2155 1&3rd s	Denmark, R Denmark Intl	7205na	9495na	9590au
2145-2200 a	Greece, Voice of	9425au		
2145-2200	United Kingdom, BBC WS	5990as	7160as	9580as

2200 UTC

2200-2300	Australia, Radio	9475as 9660pa 11880pa 15365pa	9580pa 11660pa 11955pa 17795pa	9610as 11695pa 13745pa 17860pa	9645as 11855as 13755pa
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2300	Canada, R Canada Intl	5960am	9755va	13650va	13740va
2200-2300	China, China Radio Intl	5960am	11705as	13670am	15305am
2200-2300	Costa Rica, RF Peace Intl	7110eu	9880eu		
2200-2300	Cuba, Radio Havana	6205am	7385am		
2200-2230	Ecuador, HCJB	6180na			
2200-2245	Egypt, Radio Cairo	15550eu			
2200-2300	Eqt Guinea, Radio Africa	9900eu			
2200-2215	Ghana, Ghana Broadc Corp	15186af			
2200-2230	India, All India Radio	4915do			
2200-2230	Iran, VOIRI	7410eu	9910eu	9950eu	11620au
2200-2225	Italy, RAI Intl	11715au	15225au		
2200-2300	Lebanon, Voice of Hope	6175au			
2200-2300	Malaysia, Radio	5975as	9710as	11815as	
2200-2225 mtwhf	Moldova, R Moldova Intl	6280eu	9960me		
2200-2300 smtwh	New Zealand, R NZ Intl	7295do			
2200-2215	Nigeria, FRCN/Radio	7520eu			
2200-2230 s	Norway, Radio Norway Intl	11735pa	4990do		
2200-2200 vl	Palau, KHBN/Voice of Hope	3326do	4990do		
2200-2208 vl	Papua New Guinea, NBC	9485au			
2200-2300	Russia, Voice of Russia WS	9985as	11735as	13615as	
2200-2215	Sierra Leone, SLBS	4890do			
2200-2300	Slovakia, Adv World Radio	7070na	7250na	9665na	11750na
2200-2205	Syria, Radio Damascus	3316do			
2200-2300	Taiwan, VO Free China	9455af			
2200-2300	Turkey, Voice of	12085na	15095na		
2200-2300	UAE, Radio Abu Dhabi	15600eu	17750eu		
2200-2300	United Kingdom, BBC WS	9560va	9655va		
2200-2300	USA, KAIJ Dallas TX	9605na	9695na	9770na	
2200-2300	USA, KTBN Salt Lk City UT	3955eu	5905as	5975va	6175va
2200-2300	USA, Monitor Radio Intl	6195va	9590va	9915va	11750sa
2200-2300	USA, Voice of America	11835va	11955as	12095eu	
2200-2230	United Kingdom, BBC WS	9410eu			
2200-2300	USA, KAIJ Dallas TX	13815am	15725am		
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	13770na	13840as	15405as	15665sa
2200-2300	USA, Voice of America	7215va	9705va	11760va	15185va
2200-2230 mtwhf	USA, Voice of America	15290va	15305va	17735va	17820va
2200-2300	USA, WEWN Birmingham AL	6035af	7415af	12080af	13710af
2200-2300	USA, WGTG McCaysville GA	7425na	11820eu	13615na	
2200-2300	USA, WHRI Noblesville IN	9400am			
2200-2300	USA, WJCR Upton KY	9495am			
2200-2300	USA, WRMI/R Miami Intl	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA	9955am			
2200-2300 mtwhf	USA, WVHA Greenbush ME	15420am			
2200-2300 s	USA, WVHA Greenbush ME	5850eu			
2200-2300	USA, WWCR Nashville TN	5850eu			
2200-2245	USA, WYFR Okeechobee FL	7435am	9475am	12160am	13845am
2200-2210	Zambia, ZNBC Radio 2	17845af	21525eu		
2203-2210	Croatia, Croatian Radio	6165do			
2210-2300 vl	Papua New Guinea, NBC	5985eu	7165eu	13830am	
2230-2255	Austria, R Austria Intl	9675do			
2230-2257	Czech Rep, Radio Prague	5945eu	6155eu	9880eu	
2230-2300	Russia, Voice of Russia WS	9430na	11600af		
2230-2300	United Kingdom, BBC WS	7125na			
2238-2255 1&3rd s	Denmark, R Denmark Intl	7325va			
2240-2250	Greece, Voice of	9495na	11840au		
2245-2300	Ghana, Ghana Broadc Corp	9425au			
2245-2300	India, All India Radio	3366do	4915do		
2245-2300	Vatican State, Vatican R	7155as	9705as	9950as	11620as
2245-2300	Vatican State, Vatican R	11660as			
2245-2300	Vatican State, Vatican R	7305as	9600as	11830au	

FREQUENCIES

2300-0000	Australia, Radio	9610as	9660pa	11645as	11660pa	2300-0000	United Kingdom, BBC WS	3955eu	5975va	6175va	6195va
		11695as	11855as	13745pa	13755as			7295as	9580as	9590na	9915va
		15365pa	17795pa	17860pa				11750sa	11945as	11955as	
2300-0000	Bulgaria, Radio	7480na				2300-2330	United Kingdom, BBC WS	3915as			
2300-0000	Canada, CBC N Quebec Svc	9625do				2300-2315	United Kingdom, BBC WS	11835va			
2300-0000	Canada, CFCX Montreal	6005do				2300-0000	USA, KAIJ Dallas TX	13740am	13815am		
2300-0000	Canada, CFRX Toronto	6070do				2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	Canada, CFVP Calgary	6030do				2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	Canada, CHNX Halifax	6130do				2300-0000	USA, Monitor Radio Intl	13625as	13770af	15405as	15665sa
2300-0000	Canada, CKZN St John's	6160do				2300-0000	USA, Voice of America	7215va	9705va	9770va	11760va
2300-0000	Canada, CKZU Vancouver	6160do						15185va	15290va	15305va	17735va
2300-2359	Canada, R Canada Intl	5960am	9755am	11940am	13670am			17820va			
		15305am				2300-0000	USA, WEWN Birmingham AL	7425na	11820eu	13615na	
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am	2300-0000	USA, WGTG McCaysville GA	9400am			
		13750am	15460am			2300-0000 vi	USA, WHRI Noblesville IN	5745am	9495am		
2300-0000	Costa Rica, RF Peace Intl	6205am	7385am			2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000	Egypt, Radio Cairo	9900na				2300-0000 twrfa	USA, WRMI/R Miami Intl	9955am			
2300-2350	Germany, Deutsche Welle	7235as	9690as	12045as		2300-0000	USA, WRMO New Orleans LA	7355am			
2300-0000	Guatemala, Adv World R	11775am				2300-0000	USA, WWCR Nashville TN	5065am	7435am	9475am	13845am
2300-0000	India, All India Radio	9705as	9950as	11620as	13700as	2300-2315	Vatican State, Vatican R	7305as	9600as	11830na	
		15145as				2303-2310	Croatia, Croatian Radio	5895eu	7165eu		
2300-0000	Japan, NHK/Radio	5965eu	9535eu	9560as	11850pa	2307-0000	New Zealand, R NZ Intl	15115pa			
2300-0000	Malaysia, Radio	7295do				2310-2315	Kyrgyzstan, Kyrgyz Radio	4010eu			
2300-2325 mtwhf	Moldova, R Moldova Intl	7520eu				2325-2336 mtwhf	Lebanon, Voice of	6550eu			
2300-2306	New Zealand, R NZ Intl	11735pa				2330-0000	Australia, Radio	9645as	9850as	13605as	15240pa
2300-2315	Nigeria, FRGN/Radio	3326do	4990do			2330-2355	Belgium, R Vlaanderen Int	9925na	11690sa		
2300-2350	North Korea, R Pyongyang	11700na	13650na			2330-2359	Netherlands, Radio	6020na	6165na	9845na	
2300-0000 vi	Palau, KHBN/Voice of Hope	9985as	11735as	13615as		2330-0000	Vietnam, Voice of	9840eu	12010eu		
2300-0000 vi	Papua New Guinea, NBC	9675do				2335-2345	Greece, Voice of	9395sa	9425sa	11595sa	
2300-2356	Romania, R Romania Intl	7105na	9570na	9625na	11940na	2338-2355 1&3rd s	Denmark, R Denmark Intl	7275va	7490va	9485va	
2300-0000	Russia, Voice of Russia WS	7125na	7240na	9665na	11750na	2355-0000	Japan, NHK/Radio	9570as	11685au		
2300-0000	UAE, Radio Abu Dhabi	9605na	9695na	9770na							

SELECTED PROGRAMS

Sundays

- 2300 Costa Rica, R for Peace Intl: World of Radio.
 2300 Egypt, Radio Cairo: Egyptian Music.
 2300 USA, WWCR #4 Nashville TN: Nashville Songwriter's Night.
 2305 Canada, RCI Montreal: Random Sampling.
 2310 UK, BBC London (af/am): Words and Music. Martin Hendley tells the story of a song.
 2310 UK, BBC London (as pac): East Asia Today. News, analysis, press reviews and reports from BBC correspondents.
 2315 Bulgaria, Radio: Answering Your Letters.
 2315 UK, BBC London (af/am): The Learning World. See S 1130.
 2330 Belgium, R Vlaanderen Intl: Brussels Calling.
 2330 Egypt, Radio Cairo: Egyptian Songs.
 2330 UK, BBC London (am): In Praise of God. See S 0230.
 2330 UK, BBC London (as pac): New Ideas. Window on the world of technology, innovation and new products.
 2332 Russia, Voice of: Folk Box.
 2335 Belgium, R Vlaanderen Intl: Radio World.
 2345 Belgium, R Vlaanderen Intl: PO Box 26.
 2350 UK, BBC London (as pac): Write On. See S 0345.
 2354 Netherlands, Radio (am): Siren Song.

Mondays

- 2300 Canada, RCI Montreal: The World at Six.
 2310 UK, BBC London (af/am): Take Five. A short series of human interest stories.
 2310 UK, BBC London (as pac): East Asia Today. See S 2310.
 2315 UK, BBC London (af/am): Record News. See S 0445.
 2330 UK, BBC London (am): Multitrack Hit-List. See M 1615.
 2330 UK, BBC London (as pac): The World Today. See M 1645.
 2332 Russia, Voice of: Yours for the Asking.
 2339 Belgium, R Vlaanderen Intl: Belgium Today (M-F).
 2344 Belgium, R Vlaanderen Intl: Focus on Europe.
 2345 UK, BBC London (as pac): Variable Feature. See S 1130.
 2353 Netherlands, Radio (am): A Good Life.

Tuesdays

- 2305 Egypt, Radio Cairo: E-Mail.
 2310 UK, BBC London (af/am): Voicebox. See S 1455.
 2310 UK, BBC London (as pac): East Asia Today. See S 2310.
 2315 UK, BBC London (af/am): Youth. Your Questions of Faith. See T 1145.
 2330 UK, BBC London (am): Megamix. See T 1615.
 2330 UK, BBC London (as pac): The World Today. See M 1645.
 2332 Russia, Voice of: The Jazz Show.
 2345 Belgium, R Vlaanderen Intl: Living in Belgium.
 2345 UK, BBC London (as pac): Development '96. See S 0615.
 2349 Belgium, R Vlaanderen Intl: Green Society.

Wednesdays

- 2310 UK, BBC London (af/am): Science View. See W 0040.
 2310 UK, BBC London (as pac): East Asia Today. See S 2310.
 2315 UK, BBC London (af/am): Country Style. See S 0010.
 2330 UK, BBC London (am): Multitrack X-Press. See W 1615.
 2330 UK, BBC London (as pac): The World Today. See M 1645.
 2345 UK, BBC London (as pac): From Our Own Correspondent. See S 0330.
 2349 Belgium, R Vlaanderen Intl: The Arts.

Thursdays

- 2310 UK, BBC London (af/am): Take Five. See M 2310.
 2310 UK, BBC London (as pac): East Asia Today. See S 2310.
 2315 UK, BBC London (af/am): Variable Feature. See S 1130.
 2330 Egypt, Radio Cairo: Arabic Music.
 2330 UK, BBC London (af/am/eu): Popular Music. Rock Salad. See W 1530.
 2330 UK, BBC London (as pac): The World Today. See M 1645.
 2332 Russia, Voice of: The Jazz Show.
 2344 Belgium, R Vlaanderen Intl: International Report.
 2345 UK, BBC London (as pac): The Farming World. See S 1445.
 2349 Belgium, R Vlaanderen Intl: Economics.

Fridays

- 2310 UK, BBC London (af/am/as pac): Spotlight. See S 0005.
 2315 UK, BBC London (af/am/as pac): The Insider's Guide. See F 0005.
 2325 Japan, Radio: Music and Book Beat.
 2325 UK, BBC London (af/am): Book Choice. See S 1525.
 2325 UK, BBC London (as pac): Words and Music. See S 2310.
 2330 Australia, Radio: At Your Request.
 2330 UK, BBC London (am): Multitrack Alternative. See F 1330.
 2330 UK, BBC London (as pac): The World Today. See M 1645.
 2332 Russia, Voice of: Folk Box.
 2345 UK, BBC London (as pac): Seeing Stars (1). See S 0430.
 2345 UK, BBC London (as pac): Short Story. See S 0430.
 2349 Belgium, R Vlaanderen Intl: Tourism.
 2349 Radio Netherlands: Documentary. Living on the Land — Part 2 (2 Aug). See F 2354.
 2354 Radio Netherlands: Documentary. Living on the Land — Part 3 (9th). See W 1154.
 2354 Radio Netherlands: Documentary. Wake of the Half

- Moon — Part 1 (16th). See A 2354.
 Radio Netherlands: Documentary. Wake of the Half Moon — Part 2 (23rd). See F 1454.
 2354 Radio Netherlands: Documentary. Wake of the Half Moon — Part 3 (30th). A three part series. David Swatling traces the history of the 17th century Dutch colony New Netherland.

Saturdays

- 2300 UK, BBC London (af/am): Play of the Week (from 2230). See S 0530.
 2308 Canada, RCI Montreal: Quirks and Quarks.
 2310 Romania, Radio Romania Intl: The Week.
 2310 UK, BBC London (as pac): From Our Own Correspondent. See S 0330.
 2330 UK, BBC London (as pac): Variable Feature. See S 1130.
 2339 Belgium, R Vlaanderen Intl: Music from Flanders.
 2343 Romania, Radio Romania Intl: Bucharest Along the Centuries.
 2349 Romania, Radio Romania Intl: Radio Romania DX Mailbag.
 2356 Egypt, Radio Cairo: Egyptian Songs.

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VENERABLE SCANNER CLUB HITS HARD TIMES

Unless some unanticipated rescue effort achieves a last-minute reprieve, the Radio Communications Club of America (RCMA) will be shutting down its publication, *Scanner Journal*. The club found itself with insufficient funds to publish any more issues. It had been trying to increase the magazine's exposure by newsstand sales, but the investment may have proved too much of a strain.

Richard Barnett will be covering a little of the history of this influential club in an upcoming "Scanning Report" column.

MONITORING CLUBS OUTSIDE NORTH AMERICA

Associazione Italiana Radioascioto (AIR):

C.P. 873, 34100 Trieste, Italy. Broadcasting all bands, utilities, pirates. *Radiorama* (Italian) 70,000 lire. April 25 annual mtg.

Australian Radio DX Club Inc: P.O. Box 227, Box Hill, Victoria 3128, Australia. SW, MW, Utilities. *Australian DX News*. Sample 2 IRCs or \$2US cash.

British DX Club: Colin Wright, 126 Bargery Road, Catford, London, SE6 2LR, United Kingdom. UK and international. SW, MW, AM, FM DXing, pirate and clandestine. *Communication*. L10 UK, L12 Eur, L16 ww. Sample 3 IRCs or \$2 US cash. Meets monthly in Twickenham (London).

Club d'ondes courtes du Quebec: Denis Pronovost, C.P. 61, Anjou, Quebec, Canada H1K 4G5. E-mail: papineau@msn.com. Exclusively shortwave. Annual \$40 Canadian. *L'Onde*, monthly (French). Sample US\$2.

Danish Shortwave Clubs International

(DSWC): Travleager 31, DK-2670 Greve, Denmark. SW, MW, Utilities. *Shortwave News* monthly (English). D.kr.225/45 IRCs Nordic countries. Sample 4 IRCs.

DX Australia: P.O. Box 422, Moonee Ponds, Victoria 3039, Australia. MW, SW. *DXers Calling*.

DX Club of India: Navin Patel, 1-Dutt Niwas, 809 - M.G. Road, Mulund, Bombay-400 080, India. India; MW/SW/Ham. *DX World* (quarterly) Rs 50/-, 30 IRCs outside India. 3 IRCs sample.

DX Club Paulista: Marcelo Toniolo Dos Anjos, C. Postal 592, Sao Carlos - SP (Brasil), 13560-970, South America. Shortwave, including utilities. *Actividade DX* (in Portuguese).

Finnish DX Association: Mr. Heikki Aarveaara, Suomen DX-Liitto, P.O. Box 454, FIN-00101 Helsinki, Finland; +358-0-6949017 fax. Finland and worldwide. SW and BCB. *Radiomaailma*.

Friendship DXers Club: Ing. Santiago San Gil Gonzalez, C.D.X.A - International, P.O. Box 202, Barinas 5201-a, Estado Barinas, Venezuela. Venezuela and Caribbean. DXing all bands. Cadena DX, YV-2-FSW, Sunday 1130-1330 UTC on 7113 kHz. Venezuelan membership free.

International DX Association: Bedanta Das, 1 - No. Galiyahati, Near Night School, Barpeta - 781301, Assam, India.

International DX Organization: Radio Juel Club, c/o Ranjit Kr. Nath, G.C. Lana Galiyahati, Barpeta, India. Ham/DX/SWL. Annual 60/-rs or 22 IRCs. *DX Around* (quarterly) sample plus club info 14 IRCs.

International Listeners Organization: Kalab Abbas, St. No. 1, H. No.231 Waris Rd, Sheikhupura, Pakistan 39350 South Asia. Broadcasting. *Listener Times*.

International Radio Youth Club: G.M. Mostafa Kamal, Amla Wapda Colony-1, Kushtia-7032, Bangladesh

National Society of Pakistani DXers: Mr. Liaqat Ali, E-161/1, Iqbal Park, Opposite Adil Hospital Defence Housing Society Road, Lahore Cantt., Pakistan. Worldwide. All wave. Has

library, meets fortnightly 1400-1800 UTC at library. 4 IRCs for more info.

New Zealand Radio DX League: P.O. Box 3011, Auckland, New Zealand. MW, SW, FM, TV, utilities. *New Zealand DX Times*. Sample 2 IRCs. Branches meet monthly.

New Zealand DX Radio Association: Mr. R. Dickson, 88 Cockerell St., Brookville, Dunedin, New Zealand. MW, SW, amateur and utilities. *Tune-In*. **North Ontario Radio Listener's Club:** P.O. Box 179, Oamaru, New Zealand.

Pakistan SW Listeners Club: Mrs. Fatima Naseem, Sultanpura, Sheikhupura, 39350 Pakistan; Pakistan; SWBC.

QSL Club de France: Patrick Frigerio, 40 Rue de Haguenau, 67700 Saverne, France. SWBC, pirates, CB-DX, hams, etc. *Courrier* (in French). 6 bulletins, 72 FF, EEC=16 IRCs, elsewhere 20 IRCs.

Shortwave Radio Communications Club: Atiqur Rehman, Dawood Street, Khalid Road, Sheikhupura, P.C. 39350 Pakistan. South Asia; MW/SW. *The Amateur* (Urdu language). Meets 1st Fri on SW Complex, S.K.P.

South African DX Club (SADXC): P.O. Box 18008, Hillbrow 2038, South Africa; MW, SW, utilities. \$60 annual airmail to US; *The South African Shortwave Listener*.

Southern Cross DX Club Inc.: Stephen Newlyn, G.P.O. Box 1487, Adelaide, SA 5001, Australia. Worldwide and Pacific. All bands. *DX Post*. \$25 annual in Australia. Meets last Fridays, 8pm, Thebarton.

Swedish DX Federation (SDXF): Box 3108, S-103 62 Stockholm, Sweden. 10 issues *Eter-Aktuellt*. Membership in Sweden 160 SC annual. SweDX BBS +46-(0)8-53034727; Fidonet 2:201/339; Internet sypop@swedx.ct.se

Stichting ScanSearch Military Aircraft Communications (SC-MAC): Gerbrand Diebels, Postbus 644, 5700 AP Helmond, Netherlands. Military aviation NW Eur (VHF/UHF) and worldwide (HF). *Airlift* (Dutch) bi-monthly. FL40 +FL10 enrollment.

Universal DX League: Mr. Kanwarjit Sandhu, 408, Krishna nagar, Ludhiana 141 001, India. India and Int'l: SW/MW/AM/FM/TV DXing/Pirate and Clandestine. *DX Post* bi-monthly, sample 4 IRCs. Annual 24 IRCs or US\$10. SWL net: Sun 0300 UTC on 7080 / 1600 on 14150 SSB, VU3SIO net control. **Viamão DX-Club:** Alencar Aldo Fossá, P.O. Box 101, Cunhas Road 1286, Jaguaribe Residential Park, 94400-970 Viamão, Rio Grande Do Sul, Brazil, South America. SWBC. Meets occasionally; multi-lingual.

Wonderful World of Shortwave: Baber Shehzad, 43 - Habib Colony, Bahawalpur, 63108 Pakistan. Asia and worldwide. SW listening; mail forwarding service. Annual 5 IRCs Asia & Middle East, 10 IRCs elsewhere. *WAVES* (quarterly).

Worldwide DX Club: Michael Bethge, Postfach 1214, D-61282 Bad Hamburg, FRG. E-mail 100657.2376@compuserve.com. Worldwide membership. SW/MW/Utilities. Annual DM 30.00 or 15 IRC's. *DX Magazine*, monthly (English, some German) Sample DM 1.75 or 2 IRCs.

DecalcoMania: Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (908)591-2522. Worldwide AM, FM and collecting radio related items.

DecalcoMania. \$10 US, \$11 Can/Mex, \$16 Eur, \$17.50 Asia/Pac.

DX Audio Service (National Radio Club): Ken Chatterton, P.O. Box 164, Mannsville, NY 13661-0164, (315) 387-3583; <http://wcoil.com:80/~gnbc/> Worldwide. North American Broadcasters. *DX-Audio Service* (90-min.tape). Sample \$3.

Fire Net: Tom Kravitz, Box 1307, Culver City, CA 90232, 310-838-1436, internet mpage@netcom.com. All of California; fire, EMS, tied in with nationwide notification net.

Houston Area Scanners & Monitoring Club: Glen Dingley, 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW. Paging network. *HASMC Newsletter*. Meets Jan & June.

Hudson Valley Monitors Association (HVMA): Patrick Libretti, P.O. Box 706, Highland, NY 12528. Mid-Hudson valley and surrounding counties; VHF/UHF, public safety. *The Hudson Valley Monitor*. **International 11 Meter Alliance:** Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands, esp. 11 meters.

Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor* (34 x) \$25 US, \$27 Can/Mex, \$28.50 ww. First-class stamp or 2 IRCs for sample.

Longwave Club of America: Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215) 945-0543. Worldwide; Longwave only. *The Lowdown*. \$18 US, \$19 Can/Mex, \$26 ww.

Metro Radio System: Julian Olansky, P.O. Box 26, Newton Highlands, MA 02161, (617) 969-3000. New England states; Public Safety. *M.R.S. Newsletter*.

Michigan Area Radio Enthusiasts: P.O. Box 530933, Livonia, MI 48153-0933. E-mail xx024@detroit.freenet.org. Great Lakes Region. All bands. *Great Lakes Monitor*. \$9.50 annual US & Canada. \$1 sample.

Minnesota DX Club: Greg Renner, 16330 Germane Court, Rosemount, MN 55068, for meeting info. Minnesota. All bands. *MDXC Newsletter*. \$10 annual.

Monitoring the Long Island Sounds: Ed, 2134 Decker Ave, North Merrick, NY 11566. Primarily scanner, some SWL. 50 mi. radius of LI. Net Tues 8pm 146.805. *Monitoring the Long Island Sounds*.

MONIX (Cincinnati/Dayton Area Monitoring Exchange): Mark Meece, 7917 Third St., West Chester, OH 45069-2212, (513)777-2909. SW Ohio, SE Ind., N Ken; All bands. Meets 2nd Sats 7pm. Net Thurs 9:30 145.210/4.610. No dues.

Mountain NewsNet: James Richardson, P.O. Box 4488, Estes Park, CO 80517-4488, (970) 586-4325vx; 4357fax; Internet jimfun@aol.com. Colorado statewide. Public Safety notification group. *Mile High Pages*.

National Radio Club: Paul Swearingen, Publisher, P.O. Box 5711, Topeka, KS 66605-0711, (913)266-5707; <http://wcoil.com/~gnbc/> Worldwide; AM DXing. *DX News* 30 times yearly, sample for a first class stamp. Annual Labor Day convention.

New England Scanner Group: P.O. Box 1024, Derry, NH 03038. CT, ME, MA, NH, RI, VT. \$29.95 annual.

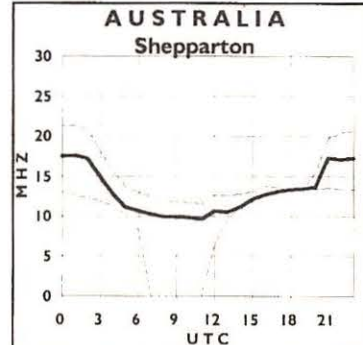
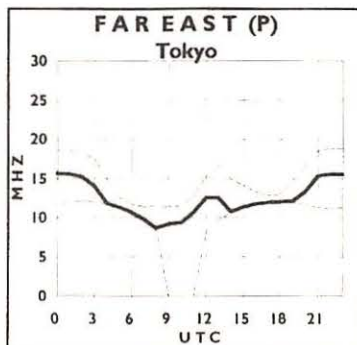
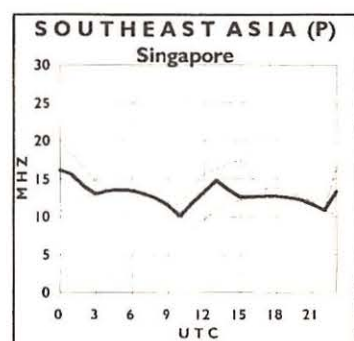
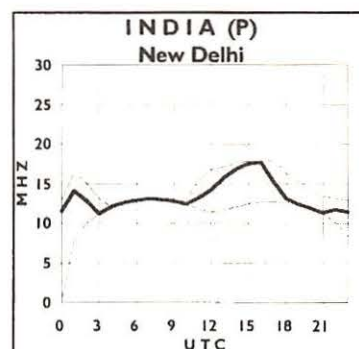
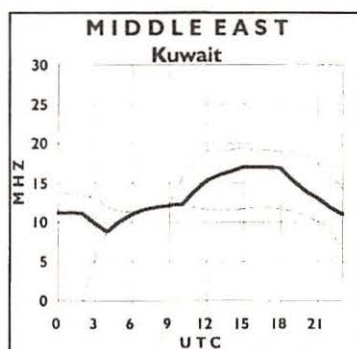
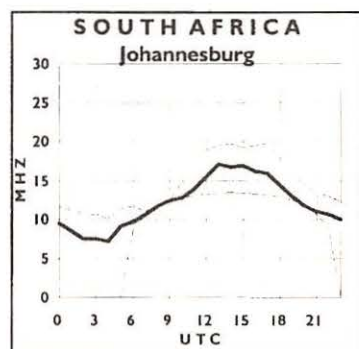
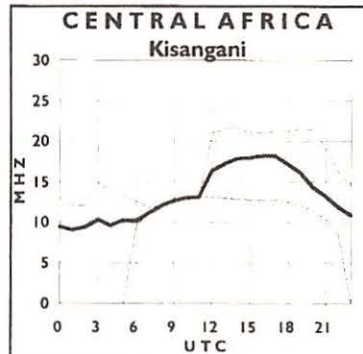
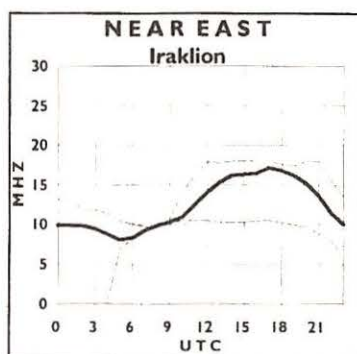
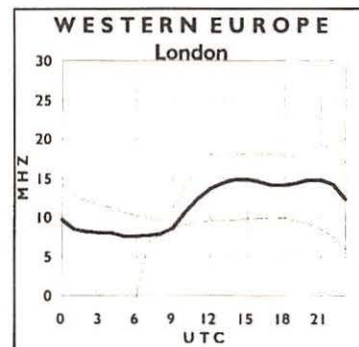
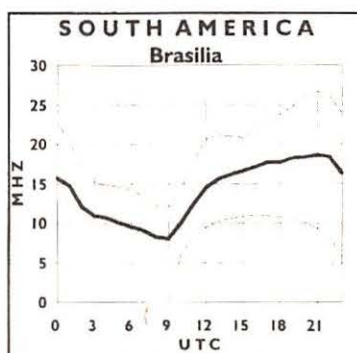
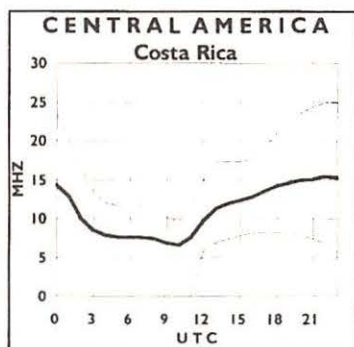
North American SW Assoc: Bill Oliver, 45 Wildflower Lane, Levittown, PA 19057, naswa1@aol.com (215) 945-0543. Worldwide; Shortwave broadcast only. *The Journal*. Web site: <http://www.mcs.com/~ralph/html/naswa/>. Regional meetings. \$26 annual in NA.

North Central Texas SWL Club: Alton Coffey, 1830 Wildwood Drive, Grand Prairie, TX 75050. North Central TX area; All bands.

Northeast Ohio SWL/DXers: Donald J. Weber, P.O. Box 652, Westlake, OH 44145-0652. NE Ohio; SWBC and utilities. Check for new meeting sked.

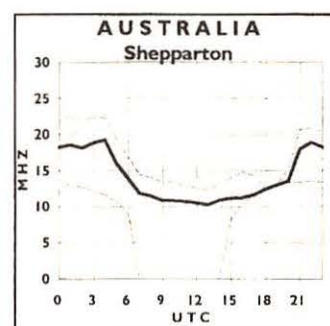
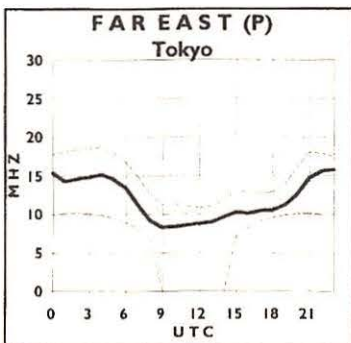
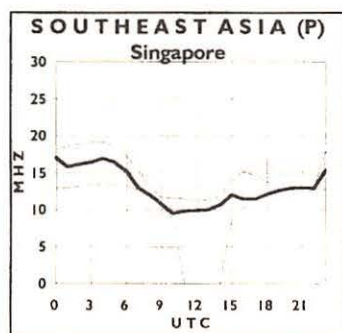
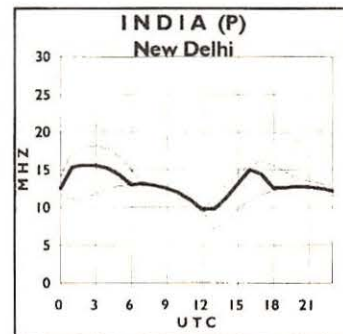
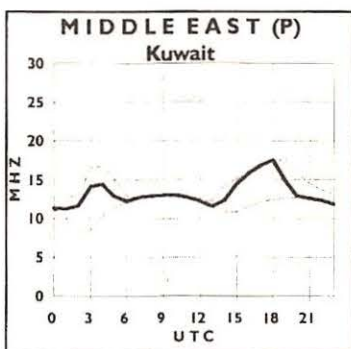
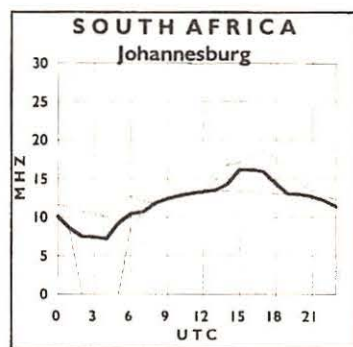
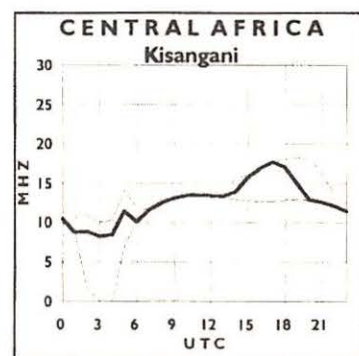
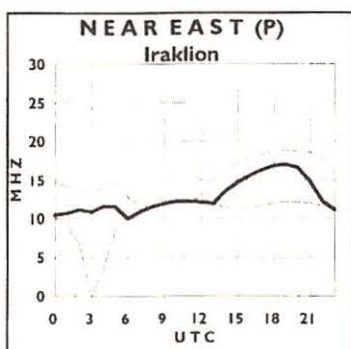
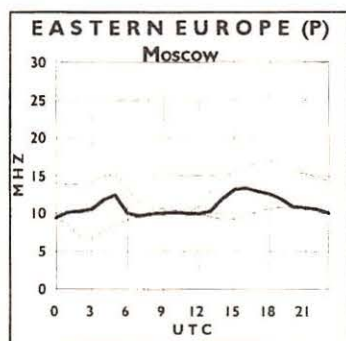
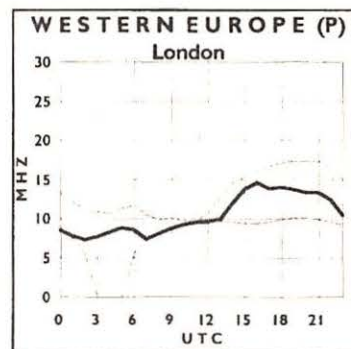
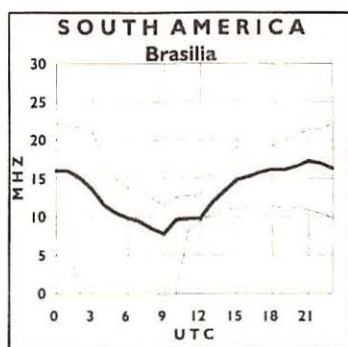
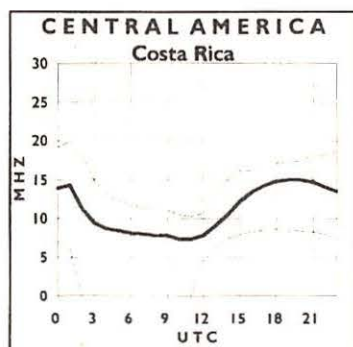
Propagation Conditions: Eastern United States

How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear. The Sun Spot Number used this month for forecasting purposes is 6.



Propagation Conditions: Western United States

Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.



Is it Sound or Radio?

It's a valid question asked by many listeners at one time or another: "Why can't whistlers, submarine comms, Omega, and other signals occurring below 20 kHz be detected by the human ear? After all these signals *do* fall within the range of audio frequencies don't they?"

Well, yes, they do. But there are important differences in the *type* of energy being radiated. With the differences clearly understood, it can be seen that sound and low frequency radio are separate entities requiring a different means of detection.

Radio waves fall into the electromagnetic spectrum—and, as the name implies, are composed of both electrical and magnetic fields. We capture a desired radio signal with the tuned front end of a receiver. Through amplification, demodulation, and connection to a loudspeaker, we finally get an audible signal.

Sound is an entirely different form of energy. It is the result of compression and expansion of the air molecules around us, which produce mechanical vibrations in the eardrum. These vibrations stimulate the auditory nerves to create the sensation of hearing. Sound, in its original form, is not electrical energy.

WHY THE CONFUSION?

I believe the mix-up between sound waves and ELF/VLF radio stems from the fact that both types of energy are measured in Hertz, a term meaning "cycles-per-second." It's therefore understandable for someone to conclude that "frequency is frequency" and wonder why these signals can't be detected by ear.

It must be remembered that "frequency" is simply a measurement of the number of times an event occurs in a given period, whatever that event may be. In the case of sound and radio waves, the originating events are quite different. Table 1 lists some key properties of sound and radio waves.

WHERE DOES "RADIO" BEGIN?

Most frequency charts show 9 or 10 kHz as the lower limit for useful radio transmission. Nevertheless, radio signals such as whistlers, tweaks, and some ELF sub-

marine communications often take place at much lower frequencies. The gigantic Navy transmitter in Clam Lake, Wisconsin, for example, operates at 76 Hertz—less than 1 kHz! These are true electromagnetic emissions which happen to occur in a frequency range normally associated with the measurement of audio frequencies.

Longwave Near and Far

The February '96 column on European longwave stimulated a lot of interest in overseas monitoring. In that column I asked if there had been any successful loggings of European beacons in North America. Although such intercepts are exceedingly rare, a few East Coast readers stepped forward to report isolated success.

One such listener was Bill Hepburn (Ontario, Canada). Bill managed to snag beacon LMC in Jan Mayen, Norway while DXing several years ago from Niagara Falls. That beacon is no longer operating, but it was a special "Consolan" station that provided a DF bearing by counting the number of dashes versus dots and then consulting a conversion table. By triangulating with two or more stations, an accurate fix could be obtained.

Stan Andrews (Dunedin, New Zealand) checked in via The Internet with a report on LF experimenting in his country. Stan reports that Full Call Amateur Radio Operators can apply for permission to operate in the band 165 to 190 kHz, subject to the following conditions: (a) users must put up with any

interference that may occur, and (b), they must exit the band immediately if the legitimate holder of the frequencies requests their return.

Judging from Stan's comments, there is a fair amount of LF activity in New Zealand. He reports that signals have been heard as far away as Melbourne, Australia, and Cromwell, New Zealand. The usual transmitting frequency in New Zealand is 181.4 kHz, but these operators also gather on the 80 meter ham band (3850 kHz) every Thursday evening for an informal net.

MT's own Jacques d'Avignon forwarded news of a new LF band in the United Kingdom. The report announced that the UK Radiocommunications Agency has allocated 71.6 kHz to 74.4 kHz for amateur use following requests from the Amateur Radio Community. The band will be available to all UK amateurs holding a Class A license. It certainly appears that interest in the low frequencies is picking up worldwide.

End Notes

We all know that summer is not known for quiet radio conditions. However, it's not a time to give up on the low frequencies. Try listening in the morning hours before noise levels build up. Also, you might want to place more emphasis on local and regional monitoring. (It's easy to lose sight of the local scene if most of your listening has been done at night when the band is filled with "dueling" signals.)

When all else fails, summer is the perfect time to check out local flea markets and swap meets for hidden longwave treasures. You might be able to pick up a new-to-you rig or some other station accessory for the upcoming DX season.

My own flea market travels have netted me a Realistic DX-160 receiver which includes longwave coverage. Although it performs adequately, I would like to align the set to its original specifications. I'd appreciate hearing from any reader who might be able to provide a *service* manual (or photocopy) for this '70s classic.

See you next month!

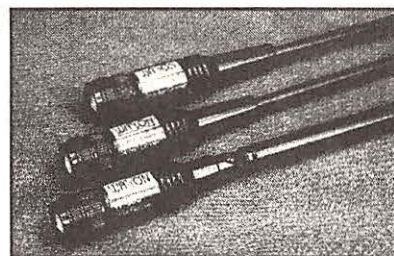
TABLE 1: Sound and Radio Comparison

	<u>RADIO</u>	<u>SOUND</u>
Type of energy molecules	Electromagnetic Field	Vibration of air
How detected	Radio Receiver	Human Ear
Speed (through air)	300,000 km per sec.	335 meters per sec.
Wavelength limits centimeters	33 km to 1 mm	17 meters to 1.7
Frequency limits (as shown on most charts)	9 kHz to 300 GHz	20 Hz to 20 kHz
Typical Intensity Measurement Unit	Watts	Decibel

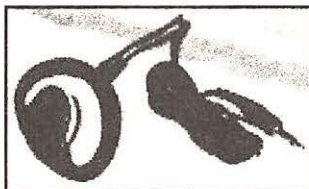
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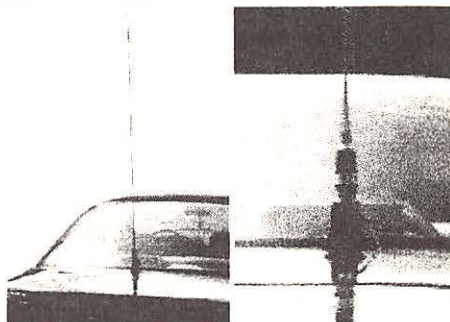
- **W-220** - 1.7 - 200MHz, 5/20/200W, SO239 connectors, Light
- **W-420** - 118 - 530MHz, 5/20/200W, SO239 connectors, Light
- **W-620** - 1.7 - 520MHz, 5/20/200W, SO239 connectors, Light

△ **ANTENNAS**

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DX Tips and Tricks

The basics of domestic-band DXing are pretty simple. Buy a radio, turn it on, figure out who you're listening to, and write it down. But after you have maybe 50-75 stations in your log, some strategy becomes necessary. I've been trying to pass along my (and your!) best strategies in this column. This month, I decided to dedicate space to some of the *little* things that may improve your totals.

Put the null to good use: Do you use a portable receiver with built-in antenna? If so, you've probably noticed you can make a station stronger by rotating the antenna. The opposite effect—the null, where the station becomes *weaker*—is probably more valuable when DXing.

You can use this null in two ways. First, if another station is interfering with your potential DX catch, rotate the radio to null the interfering station. You can often make the interference totally disappear, and even if you can't, you can still increase the chance of getting an ID.

Second, you can use the null to find the direction from which an unidentified station is broadcasting. You first need to figure out which way the null points on your radio. The sides of the radio usually point to the null. But you should test by trying to "null out" a nearby station whose tower site you know. Once you've figured this out, you can rotate the radio to weaken an unidentified station; your radio is now pointing at that station.

Select a sideband: Here's another hint for those who DX with a ham rig or modern communications receiver. Domestic-band broadcasts may be in AM mode, but try DXing them in SSB. Tuning your receiver precisely to the station's frequency (1430.00, not 1430.17) will eliminate the loud squeal from the carrier oscillator. If the desired station is suffering interference from another station on a lower frequency, select USB; if the interference is coming from above, select LSB.

SSB mode has several advantages. Many receivers use a narrower filter, about 1/3 the bandwidth, in SSB than in AM. This narrower

filter reduces the amount of noise and interference let through. The ability to select (with the USB/LSB switch) which side of the carrier you're listening to can be immensely helpful in reducing interference.

And finally, the same carrier oscillator that generates those awful beat notes as you tune across the band also guarantees a steady, strong carrier for the station you're listening to. A steady carrier greatly reduces selective fading—the severe distortion often found on DX signals.

Use the right antenna: Many of us have been very disappointed when trying to DX the AM band with one of these ham rigs or communications receivers. The sets just don't have the sensitivity they have in the shortwave bands. As with so many other areas of radio... it's the antenna. These receivers expect a "low impedance" antenna. The typical wire antenna used by most SWLs is low impedance on shortwave—but at AM, its impedance is *very* high. If you use coaxial cable to bring the signals from the antenna into the listening post, the capacitance of the coax will often bypass all the AM signals right to ground. There's nothing left to receive!

If you're using coax, try pulling the plug partially out of the antenna socket when DXing AM. You want the center pin to keep making

contact, but the connection of the outer shell should be broken. This removes the cable's capacitance from the circuit, and prevents it from robbing your DX signals. (It also makes the coax part of the antenna. If the cable runs near a source of interference, such as a computer, you may have noise problems.)

You should also use the longest antenna possible when DXing AM with this kind of receiver. Height isn't as important as length. Some of my best DX catches were logged with a Kenwood TS-680 ham rig and 400' of #14 stranded electrical wire (insulated, black...) *lying on the ground*.

Respect lightning! Many newcomers to the radio hobbies ask about lightning protection.

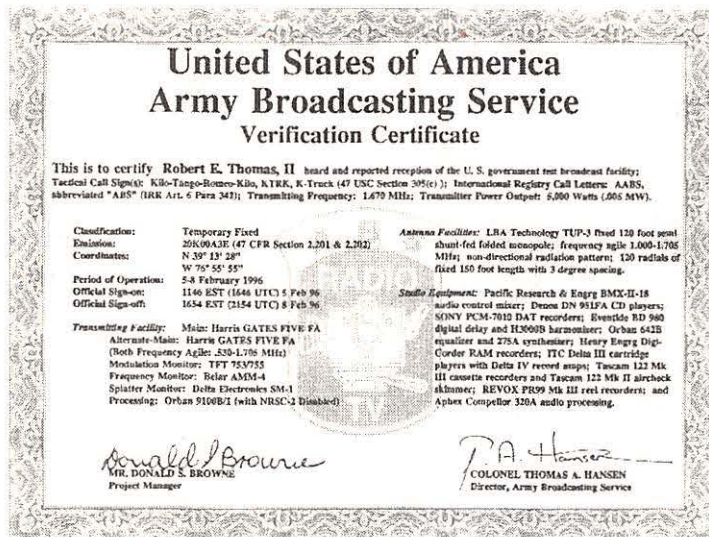
Nothing can save you if Mother Nature decides you deserve a direct hit. But some simple and inexpensive steps can help in the much more likely event of a nearby strike.

There's one foolproof method of lightning protection. Disconnect everything! Seriously, if your equipment isn't hooked up, there's no way for lightning to damage it. Disconnecting the antenna isn't enough: lightning is more likely to hit a power pole than your antenna. If you have underground electrical service, don't consider yourself immune to this problem. Even a strike hitting the ground *near* your power line can damage equipment.

If a computer is part of your DX shack, be sure to disconnect the telephone line from your modem. (My spare modem was destroyed by a strike about a mile away in late May.)

Expanded Band Notes

The FCC hasn't been doing anything new in this area. But the KTRK-1670 verifications (and those for their other calls, ARMY, ABS, etc.) are out. Program Director Donald Browne reports 312 listeners in 37 states, and 36 more in 10 other countries, sent reception reports. A standard certificate has been issued, and nine endorsements for such feats as logging the station on a car radio, hearing the first



Robert E. Thomas of Bridgeport, CT, received this verification certificate from the Army's test station KTRK-1670. Though the certificate doesn't say so, the station operated from Fort Meade, Maryland.

official sign-on, or logging special tests before official sign-on. Browne also thanks DXers for their reports.

Robert Thomas's certificate appears on this page. Others who've received the certificates include Edouard Provencher of Biddeford, Maine; Mike King of Maryland; and yours truly.

■ Bits and Pieces

• It's been a long time since this has happened, but in early June the FCC approved a new AM station. No call letters have been assigned yet, but the station will broadcast on 1340 kHz from Elko, Nevada. Don't expect to DX this one yet; most new stations require at least two years to complete construction. One new DX target that *is* ready is KLDC-670 kHz Denver. The station completed tests and applied for a permanent operating license in late May. I believe this is a religious station.

• Barry Stone G6SRE in England wrote to comment on "TV's Most Exotic DX," in June *MT*. If the supposed KLEE-TV ID was, in fact, a Kleenex ad, it couldn't have come from a British TV station. Commercial television with advertising didn't come to Britain until 1955, two years after the incident. Barry does report some other rather exotic DX on his parents' TV in the 1950s; they used to hear the Boston Police Department's two-way radio calls over local TV programs! Until the UK dropped VHF TV about 10 years ago, their channel 1 operated in the same 40 MHz area where early US police radio operated.

• The Fox TV network has built a rather exotic billboard along Sunset Strip in Hollywood. The billboard, promoting the "X-Files" program, contains a 0.1-watt radio transmitter on 1610 kHz. This flea-powered station plays a continuous loop of various sounds from the TV program. Fox claims a coverage

of about a half-mile, but a similar billboard erected on Nashville's Music Row (by MCA Records) last year was lucky to cover three city blocks.

• In Chicago, another exotic situation on the AM band is likely to disappear. Three AM stations in that city (WCRW, WEDC, and WSBC) share the use of the 1240 kHz frequency; this is the only place where more than two stations share a channel. In late May, WCRW sold their station to WSBC for about \$700,000. I expect the WCRW license to be returned to the FCC for cancellation; WSBC will take over WCRW's hours.

• Well, that didn't take long! In February, the new Telecom Act lifted the 20-station limit on how many radio stations one company could own. In early June, Clear Channel Communications purchased Hefel Broadcasting's 18 stations. If approved by the FCC, Clear Channel would control 112 radio stations throughout the country.

Did this month's tips yield any new DX? Do you have any special hints that have improved your totals? Let us know! Write me at Box 98, Brasstown NC 28902-0098, or by email at 72777.3143@compuserve.com.

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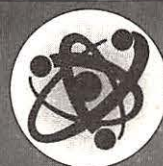
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SKIPPING IN

George Knight of Garfield, New Jersey reports some of his late-spring DX:

WIP-610
WPUT-1510
WNRB-1510

Philadelphia
Brewster, NY
Boston

George uses a Sony ICF-2010 and a GE SuperRadio III, with a Select-a-Tenna. I've also used the ICF-2010 for AM DX; it's an excellent radio for the purpose.

North American Pirates Heard in Europe & Asia

Given the current low point of the sunspot cycle, many DXers have complained about propagation conditions on shortwave. The complaints should be restricted to high bands above 19 meters, since North American pirate reception has been widely reported during 1996 from Europe and Asia!

Nick Grace, former editor of the *The ACE DiaLogs* loggings column, checks in from his temporary home in Jakarta, Indonesia. Nick heard the May 25 broadcast of **Radio Fusion Radio** on 6955 kHz from 2006 UTC until the broadcast's sign-off at 2017. The reception coincided with sunrise in Indonesia, so Nick was taking advantage of greyline signal enhancement. Congratulations go to Nick for one of the best pirate logs in DXing history!

Jakarta was not the only spot where this broadcast was heard. Ranier Brandt and clandestine expert Harald Kuhl, both of Germany, recently logged about a dozen North American pirate broadcasts from Western Europe, including the Radio Fusion transmission. Some of Ranier's and Harald's catches are listed in *MT*'s pirate loggings. The best may have been a Radio Free Speech show transmitted by one of **Radio Animal**'s portable 10 watt "Grenade" transmitters. Other European DXers have reported recent reception of North American stations, including John Campbell in the UK.

Nick Grace notes that since he has arrived in Jakarta, he hears at least a half dozen amateur Indonesian semi-pirates every day between 2400 and 3400 kHz. Since signals are getting from North America to Indonesia, the reverse should be true, especially during the fall and winter. Nick's tip gives us a real DX challenge to shoot for.

■ Israel and UK Busts

The FCC's closing of nearly all of its field monitoring sites has been correlated with a sharp decline in North American pirate busts. This has not been true in Israel and England. Israeli authorities shut down more than a half dozen FM pirates during the spring, mostly in the Tel Aviv area. British police and the Radio Investigation Service have raided nearly 200 local pirate stations already in 1996. Thanks go to several *MT* readers who sent in material on scores of overseas pirate busts, including Ullis Fleming of Maryland; Peter

Zerafa of London, UK; and offshore pirate **Arutz-7** from the Mediterranean off Israel.

■ Kusalik Verifies Bougainville

Veteran DXer Ed Kusalik of Coaldale, Alberta received an outstanding QSL from **Radio United Bougainville**. This station is operated by the government as a counter to the rebels' **Radio Free Bougainville**. Both stations use 3880 kHz variable; Ed heard them at 1000 UTC. The dispute between Bougainville rebels and Papua New Guinea continues, although it gets little press attention in North America. The address that worked for Ed was Administration of Bougainville, Radio United Bougainville Operations, PO Box 268, Buka, Bougainville Province, Papua New Guinea.

■ Europirate Web Sites

Increasing numbers of European pirate stations are opening a presence on the World Wide Web. A couple of major ones to try are the <http://www.geocities.com/Paris/2343/index.htm> site of Radio Caroline and the <http://www.imagnet.fr/~rwaves/index.htm> site of Radio Waves International. Fresh information on Europirate internet activity is regularly featured at <http://www.arpnet.it/~air/welcome.htm> from AIR, the Associazione Italiana Radioascolto.

■ What We Are Hearing

Your pirate logs are welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address at the top of the column. All frequencies are in kHz, with times in UTC.

Pirate stations listed here use the following addresses: PO Box 452, Wellsville, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; PO Box 605, Huntsville, Alabama 35804; and Postfach 220342, D-42373 Wuppertal, Germany. For return postage, enclose three 32¢ stamps in the envelope to USA addresses. \$2 US or two International Reply Coupons go to foreign maildrops.

Altered States Radio- 6955 at 2015. Eclectic music is the normal fare on William Hurt's station. Addr: Merlin. (Jerry Coatsworth, Merlin, Ontario; Rich and Talea Jurens, Katy, TX)
Dirty Dog Radio- 6955 at 0200. Veteran pirate Howard E. Lyon heard this new station with a

program of blues music and a whopping signal. Addr: None. (Howard E. Lyon, Oz)

East Coast Beer Drinker- 6955 at 0130. After a couple of years off the air, this one blew the dust off its transmitter, saying that they were not even drunk yet. Astonishingly, the broadcast was widely heard in both North America and Europe! Addr: Blue Ridge Summit. (Pat Murphy, Chesapeake, VA; Brandt; Kuhl; Wolfish)

Free Hope Experience- 6955 at 0500. Major Spook, who also uses an ID of **FHX** in Morse code, started off the summer with a marathon sequence of rock music and mailbag shows that were heard all over North America. Addr: Blue Ridge Summit. (Cathy Zylka, North Tonawanda, NY; Barry Williams, Enterprise, AL; Gigi Lytle; Lubbock, TX; John C. Mello, Scituate, RI; Ike Kelly, Houston, TX; Jurens; Lyon)

Friday Radio- 6955 at 2315. They only operate on Fridays, always an hour or two before the UTC date changes to Saturday. Every broadcast promotes the beginning of the weekend. Addr: Providence. (Evan Wiley, Suwanee, GA; Kenny Love, Columbia, SC; Michael Prindle, New Suffolk, NY)

K-2000. 6955 at 0000. The unanimous winner of all the 1995 pirate radio popularity polls is extremely entertaining. Most of their elaborate original productions have themes relating to DXing and pirate radio. Addr: Stoneham. (Prindle; Williams; Wolfish; Jurens)

KDED- 6950 at 0300. About half of the shows on the Voice of the Grateful Dead now feature rock music by artists other than Jerry Garcia. They liberally sprinkle their programs with advice for other pirates. Addr: Providence. (Randy Ruger, North Hollywood, CA; Rev. Dennis Myhand, Mercedes, TX; Don Putnick, CalTech, CA; Jurens; Wolfish; Williams; Kelly; Mello; Love; direct from the station)

KMCR- 6955 at 0400. Magic Mike and Wanda have added Morse code identifications to their longtime fare of rock music and comedy at Magic Carpet Radio. Addr: Blue Ridge Summit. (Ruger)

KNBS- 6955 at 1800. Phil Muzik's operation, "The Station with Your Mind in Mind," has been operated for eleven years by the California Marijuana Cooperative. Addr: Wellsville. (Murphy; Lyon)

Let's Kill JTA Radio- 6955 at 0000. Some unlicensed broadcasters are just not entertaining. This one's physical threats against other DXers suggests that some pirates were last in line when good taste and common sense were distributed. Addr: None. (William Hassig, Mt. Prospect, IL; David Chapchuk, Scranton, PA; Wolfish; Murphy; Williams)

Montana Audio Relay Service- 6955 at 0045. Before the surrender of the Freeman and the capture of the Unabomber, this new pirate parodied Montana's right wing extremists. Addr: Merlin. (Garie Halstead, St. Albans, VT; Lee Silvi, Mentor, OH; Coatsworth; Murphy; Chapchuk; Prindle; Williams; Wiley; Hassig)
Mystery Radio- 6950 at 0300. "The Shadow" hosts programs of electronic and jazz music that are spiced with an odd mix of technical

discussions and laughing children. Addr: Stoneham. (Neil Wolfish, Toronto, Ontario; Ruger; Hassig; Williams; Coatsworth; Jurrens Chapckuk)

North Jersey Coast Radio- 6955 at 2300. Bruce DeVito transmits from the Boardwalk in Asbury Park, NJ. A recent show mixed Donovan folk music with discussions of nude beaches. Addr: Merlin. (Jesse Rose, Hampton, VA; Silvi; Murphy; Wolfish) #s- 11660 at 1530. Ken points out that the numbers stations are still with us. He noted a 5 digit xxx-xx station with a solid signal. Addr: You're kidding. (Ken Dowst, Hartford, CT)

Omega Radio- 6951 at 0115. Dick Tator is back with his programs of rock music with a Christian slant. Addr: Wellsville. (Prindle; Mello)

Outlaw Radio- 6955 at 2030. Rock music, comedy, parody sketches, a female announcer, and an air raid siren interval signal are the defining elements of this station. Addr: Providence. (Jurrens; Chapchuk; Coatsworth; Wolfish; Kelly; Hassig; Silvi; Murphy; Williams)

Partial India Radio- 6955 at 0045. Harold Krishna and Sanjay have returned with their delightful parody of DXing, particularly All India Radio. Addr: Stoneham. (Wolfish)

Radio Angeline- 6955 at 0115. Jo Jo Katew's ode to his lost love Angeline was a frequent visitor to the pirate bands during the 1980's. Somebody has been dusting off old tapes of the show, which has a distinctive "Send in the Clowns" interval signal on a music box. Addr: Washington box has closed. (Coatsworth)

Radio Azteca- 6955 at 0230. Bram Stoker's DX parody is always funny. He's easily identified by sound effects from the old Bullwinkle cartoon. Addr: Wellsville. (Lyon)

Radio Communication International- 6955 at 2315. This Europirate, which programs German rock music, now produces broadcasts specifically for relay in North America via **NAPRS**. Addr: Wuppertal. (Jurrens; Silvi; Prindle; Wolfish; Rose)

Radio Free Berkeley- Steven Dunifer's famous Bay Area micropirate prints a bimonthly newsletter, *Reclaiming the Airwaves*. A modest donation will get a copy for you. Addr: Free Communications Coalition, 1442 A Walnut St. #406, Berkeley, CA 94709. (Douglas Smith, Pleasant View, TN)

Radio Free Salvation- 6954 at 2330. Pastor Billy D'Young cynically blisters the airwaves with his sermon decrying (or promoting) pornography on the internet. (Brandt; Zylka; Mello; Kuhl; Lyon; Williams; Wolfish; Murphy; Jurrens)

Radio Free Speech- 6955 at 1800. Bill O. Rights has an extremely realistic Rush Limbaugh parody with the voice of Rush himself explaining why conservatives are greedy, which I think is the funniest thing I've heard on shortwave all year. He promises a similar feature with Oliver North at the microphone. Addr: Wellsville. (Kuhl; Brandt; Williams; Coatsworth; Mello; Jurrens; Wolfish; Lyon; Rose; Murphy; Love; Williams; Chapchuk; Silvi; Prindle; direct from the station)

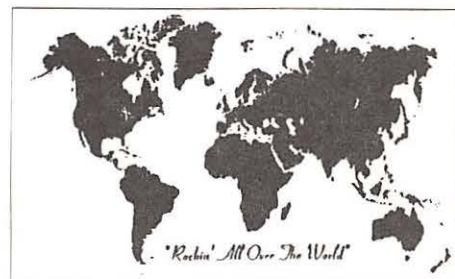
Radio Fusion Radio- 6955 at 2330. Rap music from North America heard in Europe and Indonesia: WOW! Addr: Providence. (Brandt, Kuhl, Grace; Lyon; Wolfish; Murphy; Williams; Prindle; Mello)

Radio KAOS- 6955 at 0000. Joe Mama has been a frequent occupant of the pirate bands this year. Rock music and parodies precede the



RADIO ONE

CONFIRMING YOUR RECEPTION OF OUR STATION
DATE 3-31-96 TIME 0200 / FREQ: 6,950 KHZ



RADIO TWO

CONFIRMING YOUR RECEPTION OF OUR STATION
DATE 5 MAY 96 TIME 23:50 FREQ: 6,955 KHZ

The original Radio One QSL (top) and the parody "Radio Two" QSL.

"Monty Python" theme at sign-off. Addr: Now using Wellsville. (Paul Demsky, South Portland, ME; Myhand; Prindle; Silvi; Wolfish; Hassig; Chapckuk; Ruger; Jurrens; Rose; Williams; Kelly; Murphy)

Radio Marabu- 6955 at 0000. This veteran Europirate has a relay relationship with North American transmitters. Addr: Blue Ridge Summit and Wuppertal. (Mello; Coatsworth; Prindle; Silvi)

Radio One- 6950 at 0230. Bobaloo's professionally produced mix of jingles and ancient rock oldies sounds just as good as the best commercial stations in large cities that offer this format. Addr: Wellsville. (Scott Krauss, Cleveland, OH; Prindle; Jurrens; Williams; Murphy; Coatsworth; Wolfish; Wiley; Kelly; Silvi)

Radio Two- 6954 at 2115. Parody is a staple format in pirate radio. This low budget station parodies the slick Radio One. Note the similarity in their QSL's; Scott's came in only 18 days. Addr: Providence. (Alan Pavuk, North Huntingdon, PA; Krauss; Silvi; Coatsworth; Prindle; direct from the station)

Radio USA- 6955 at 0045. Mr. Blue Sky is celebrating 13 years of in pirate radio. The programming fare on this classic station is still punk rock, pirate radio commentary, and comedy skits. Addr: Wellsville. (Murphy; Jurrens; Mello; Rose; Silvi)

RFM- 6955 at 0200. H. V. (as in Victor) Short still plugs away with mellow rock and comedy from Massachusetts. Addr: Wellsville. (Wolfish)

Starshine Radio- 6955 at 0200. Announcer Kim Hawk's tone deaf voice "sings" along with the rock music on this Europirate, which we hear via relays. Addr: Wuppertal. (Silvi; Prindle; Williams; Wolfish)

The Spectator- 6955 at 0245. This 1980's phenomenon has returned with its quite unusual Gregorian Chant music. You don't hear things like this every day on the radio! Addr: None, QSL's some logs in *The ACE*. (Wolfish; Lyon)

Up Against the Wall Radio- 6955 at 0045. Owsley commemorated the death of Timothy Leary by playing about a dozen repeats of "Timothy Leary's Dead" by the Moody Blues. (Campbell, Devon, UK; Williams; Wolfish; Wiley; Lyon; Love; Jurrens)

Voice of Juliet- 6955 at 2145. Their feminist slant is somewhat rougher than historic pirates such as WYMN. Addr: Merlin. (Williams; Chapchuk; Wiley; Silvi)

Voice of Laryngitis- 6955 at 2000. Now in their 13th year of broadcasting, Genghis and Stanley Huxley's hilarious original comedy productions have always had a huge positive influence on other pirate stations. All shows are sponsored by Friendly Freddie's Budget Burials, where death is cheap. Addr: Wellsville. (Coatsworth)

WLIS- 6955 at 0200. Charles Poltz is celebrating his fifth anniversary on the pirate bands. His consistent format is a playlist of genuine shortwave broadcast station interval signals, using a "We Love Interval Signals" slogan. Addr: Blue Ridge Summit. (Coatsworth; Murphy; Williams; Jurrens; Lyon; Hassig; Silvi; Chapchuk)

WKRS- 6955 at 0045. Jesse's May 30 log was one of the few that I have seen for this new operation, which uses the slogan of "World's Koolest Radio Station." They feature novelty tunes, some of which are

risqué. Addr: None. (Rose)

WMOM- 6955 at 2330. Here's a strange one that programs instrumental easy listening and dance music, with only occasional ID's. I finally heard this one; others have picked them up for a couple of months. Addr: None. (George Zeller, Cleveland, OH; Prindle; Coatsworth; Wolfish)

WMPR- 6955 at 1500. They have appeared rarely during the last three years, and are therefore somewhat mysterious. The station broadcasts electronic music with a "Missing Persons Radio" slogan. Addr: None, verifies some logs in *The ACE*. (Coatsworth)

WPN, World Parody Network- 6955 at 0330. Rock music is their main program content, but they mix in parodies as the station name indicates. Addr: Huntsville. (Jurrens; Kelly)

WRAY- 6955 at 1430. Their announcer "Link" uses a format entirely made up of electric guitar instrumental music, with "Dixie" played as the National Anthem at their close. Addr: None. (Murphy)

WREC- 7465 at 2330. P. J. Sparx is among the few pirates who still try to operate on 41 meters. Radio Denmark wiped him out at 2358, showing why most stations have moved down to 39 meters. Addr: Wellsville. (Williams; Zeller; Jurrens; Mello; Lyon)

WRRN- 6955 at 0015. Also known as the World Republican Radio Network, this new operation broadcasts Republican Party trivia from Montgomery, AL, with a nice selection of rock music. Addr: Wellsville. (Brandt; Zylka; Wolfish)

WRV, The Radio Virus- 6955 at 0200. Pete the Pirate has been mixing discussions of ecology in with his normal rock music fare. Addr: Wellsville. (Wolfish)

WTNT- 6955 at 2145. Kid Dynamite has featured rock music and a contest for a free trip to Hawaii on his new pirate, using a "Dynamite Radio" slogan. Addr: Providence. (Kuhl; Wolfish; Murphy; Coatsworth; Williams; Wolfish)

Building QRP

Anyone who has tried to homebrew a rig is familiar with the problem of finding parts and building a decent quality rig at a price that's less than the cost of a new commercial unit. Nevertheless, many hams still roll their own, and a lot of us would like to be able to say "rig here is homebrew."

While kits are fun, they are also fairly expensive and may still not be quite what we feel up to calling homebrew. However, if you are comfortable running lower power, plenty of building is available to you.

The April and May issues of *CQ* magazine had an article on building a QRP rig called the Micronaut. The Micronaut runs in the milliwatt range and goes together in an hour or two (my first one was built in 35 minutes on a Radio Shack universal PC board. The second took a bit longer as I wanted it to look good.)

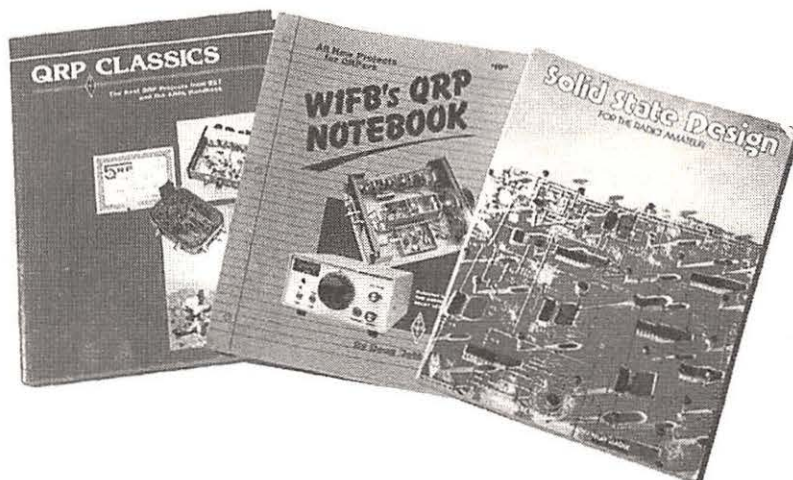
The first was built for 40 meters, the second for 30 meters. Both run about 80 milliwatts. My first QSO on 40 was nearly 500 miles with a 449 report. Now that's what I call fun. Total cost to build a Micronaut was about five bucks. Even more enjoyable is the fact that the article tells you how to homebrew a battery for the rig.

While the Micronaut is a snap to homebrew, kits for the unit are also available. Write or call for prices and information to Sescom, 2100 Ward Drive, Henderson, NV 89015-4249, or phone 1-800-634-3457.

■ Circuits and Info

Material on building low power rigs is fairly plentiful. Three books I particularly like are the *W1FB QRP Note Book* (\$10.00 from ARRL). This manual has loads of great info with many circuits for both transmitters and receivers, by MT's Doug DeMaw. PCB (printed circuit board) layouts are included.

Number two on my hit parade is *Solid State Design For the Radio Amateur*. This was the first truly outstanding book available to hams on designing and building your own gear. The book guides you through all of the steps required to design a piece of equipment and lends a hand when you run into problems. Several years ago, I built a rig out of this handbook, and since then have worked over 100 countries with it. It's one of my regular rigs. *Solid State Design* also is an ARRL publication, priced at \$12.00.



Over the years many rigs have appeared in *QST* that appealed to me but I never got around to building for one reason or another. Naturally, the various articles and circuits were lost or thrown out. Well, seems the guys up at ARRL knew I did that: so they came out with a great book called *QRP Classics* just for folks like me.

Transmitters, receivers, building ideas, and practices make this a super handbook. Of particular interest is a circuit for a receiver called the Neophyte. This simple little receiver is a real knockout for the first time builder. I built several of these simple receivers back when the article first appeared and really liked them. So, when I saw the manual included the complete Neophyte article I had to buy it.

Another feature of *QRP Classics* is a section on alternative power that I find very interesting. Several transceiver designs are also included (the Optimized transceiver for 7 MHz is currently on the N3IK work bench). The section on antennas alone is worth the price of the book. Again, it's available from the ARRL for \$12.00 (if you order from ARRL there is a shipping and handling charge of \$4.50). Their address is 225 Main St. Newington, CT 06111.

■ The Bug

Back in the May column I included a photo of one of the code "bugs" in my collection, and asked if anyone could identify it for me. Boy, was I surprised at the response on that one; it seems like there are a lot of key enthusiasts out there. I still do not have specifics on the key, but I was referred to a source which

might, so I'll let you know what I discover—thanks, folks!

■ Sunspots, Anyone?

In case you were wondering, we are still in a declining mode for the sunspot cycle. Numbers are approaching single digits per month. We cannot expect to see an upswing till late this year or early next. Consequently, the lower bands will continue to be the best to use for most operations (see ya on 160).

That's all gang; take care es 73 de N3IK, Ike Kerschner

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SPECIAL EVENT CALENDAR

Monitoring Times is pleased to run brief announcements of radio events open to our readers. Send announcements at least 60 days before the event to: Monitoring Times Special Events Calendar, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net See MT's homepage on www.grove.net for complete listing.

Aug 2-4	Austin, TX	TX State Conv / Joe Makeever, W5EBJ, 8609 Tallwood Dr., Austin, TX 78759, 512-345-0800
Aug 2-4	Park City, UT	Rocky Mt Div Conv / Duane Anderson, KJ7HO, 443 East Brandt Ct. #30, Salt Lake City, UT 84107, 801-288-1859
Aug 3	Escanaba, MI	Delta Co ARS / John Anderson, WD8RTH, 405 South 10th St., Escanaba, MI 49829, 906-789-9148. Location U.P. State Fair Grounds.
Aug 3	Springfield, MO	MO State Conv / Karen Thorpe, N0TDW, 2145 E. Crestview, Springfield, MO 65804, 417-889-6775
Aug 3	Clayton, NY	Jefferson Co RAC / Janet Long, N2ZMS, PO Box 523, Brownville, NY 13615, 315-788-8543
Aug 3	High Point, NC	High Point ARC / Mark McMahan, KB4MFP, PO Box 1163, Jamestown, NC 27282, 910-887-3039
Aug 3-4	Jacksonville, FL	No Fla Section Conv / Vern Ferris, KB4VPU, 356 Aries Dr., Orange Park, FL 32073-3262, 904-272-7250. Location: Osborn Convention Ctr nr I-10 & I-95, 9am-5pm Sat, 9am-2pm Sun. \$8 registration.
Aug 4	Peotone, IL	Hamfesters RC / David Brasel, NF9N, 6933 West 110th St., Worth, IL 60482, 708-448-0580
Aug 4	Wellesley, MA	Wellesley ARS, Babson Wireless / Barbara Holdridge, N1ICQ, 107 Church St., Westwood, MA 02090, 617-329-2628
Aug 4	Fowlerville, MI	Livingston ARK / Ray Melosh, N8CPO, 4349 East Allen Rd., Howell, MI 48843, 517-546-9209. Location: Fair Grounds 8am-2pm. \$5 gen admission. Talk-in 146.68-, 145.21-
Aug 4	Port Huron, MI	Eastern Michigan ARC / Frank Kemp, K8IOV, 829 Prospect Pl., Port Huron, MI 48060, 810-987-5071
Aug 4	Randolph, OH	Portage ARC / Joanne Solak, KJ3O, 9971 Diagonal Rd., Mantua, OH 44255, 216-274-8240
Aug 4	Matamoras, PA	Tri-State ARA / Ray Rothstein, AA2WC, PO Box 247, Huguenot, NY 12746, 914-856-0426
Aug 4	Northampton Co, PA	Delaware Lehigh ARC / Amy Zimmerman, KD3TI, RR 4, Greystone Bld., Nazareth, PA 18064-9211, 717-386-3513
Aug 4	Washington Twp., PA	Skyview Radio Soc / Robert Reihms, N3NOS, 192 North Washington Rd., Apollo, PA, 412-727-2194
Aug 4	Berryville, VA	Shenandoah Vly ARC / Irvin Barb, KD4BHV, Rt. 3, Box 5385, Berryville, VA 22611, 540-955-1745
Aug 9-11	Estes Park, CO	World TV/FM DX Assoc Conv / Jim Thomas, 4437 S. Stover, Apt 3, Ft. Collins, CO 80525. Send \$1 for info packet. Location: Dripping Springs B&B Cabins 2 mi E of Estes Park on Hwy 34 (970-586-3406 room res)
Aug 11	Charlotte, NC	Charlotte ARC / Buck Escott WB4OTP, P.O. Box 33582, Charlotte, NC 28233-3582, 704-522-4971, ex3330. Location: Roll-A-Round Skate Center, 8830 East WT Harris Blvd.
Aug 10	Quincy, IL	W Illinois ARC / Jim Funk, N9JF, R1, Box 151-A, Liberty, IL 62347, 217-336-4191
Aug 10	Valparaiso, IN	Porter Co ARC / Rich Ard, N9QLQ, PO Box 1782, Valparaiso, IN 46384-1782, 219-762-0484
Aug 10	Dryden, NY	Tompkins Co ARC / TCARC, P.O. Box 4144, Ithaca, NY 14852, Ross (N2ISU) or Lonnie (N2WGW) Boyer 607-844-4302, rmb3@cornell.edu. Location: Dryden High School. Talk-in 146.97-. \$5 admission.
Aug 10	Lewistown, PA	Juniata Vly ARC / Richard Yingling, WB3COB, PO Box 73, Yeagertown, PA 17099, 814-237-1591
Aug 10	Crossville, TN	Plateau ARC / Nicholas Smith, WA4GKM, 108 Cardinal Loop, Crossville, TN 38555, 615-484-8220
Aug 10-11	Bossier City, LA	Shreveport ARA / Alice Prudhomme, KG5ZZ, 171 Sloan Rd., Mansfield, LA 71052, 318-872-9232
Aug 11	Cedar Rapids, IA	Cedar Valley ARC / Wayne Kolosik, N0UGK, 65 Samoa Dr., Hiawatha, IA 52233, 319-393-4224
Aug 11	Frankfort, KY	Bluegrass ARS / Bill De Vore, N4DIT, 112 Brigadoon Pkwy., Lexington, KY 40517, 606-273-8345. Location: Western Hills HS, Exit 53 off I-64. \$6 admission. Talk-in 146.16+
Aug 11	Jackson, MI	Cascades ARS / Terry Osborn, KD8B, PO Box 512, Jackson, MI 49204-0512, 517-784-2398
Aug 11	St. Cloud, MN	St. Cloud ARC / W0SV, 401 4th Street North, Waite Park, MN 56387
Aug 15-18	Bowie, MD	Int'l EME Conv / Willie Mank, W1ZX, 7620 Bensville Rd., Waldorf, MD 20603, 301-645-5584
Aug 17	Huntington Bch, CA	So Cal Area DXers (SCADS) annual picnic / Bill Fisher 714-522-6434. Location: Huntington Central Park (Central Park Dr. E. entrance) 0800-1700. Bring food, colas, radios and antennas.
Aug 17	Oakland, NJ	Ramapo Mt ARC / Steven Oliphant, N2KBD, 10 Glen Rd., Ringwood, NJ 07456-2331, 201-962-4584
Aug 17	Longview, WA	Lwr Columbia ARA / Bob Morehouse, KB7ADO, LCARA, PO Box 906, Longview, WA 98632, 360-425-6076, KB7ADO@aol.com. Location: Cowlitz Co Fairgrounds, 9am-3pm. Talk-in 147.26+, pl 114.8Adm \$3
Aug 17-18	Huntsville, AL	AL Sect Conv / Steve Jones, KT4AY, 823 Baylor Dr., Huntsville, AL 35802, 205-883-5479
Aug 17-18	Albuquerque, NM	Albuquerque ARC / Judy Kirby, KC5HZE, 278 Trinity Dr. NE, Rio Rancho, NM 87124, 505-891-9132
Aug 17-18	York, PA	Hilltop, Keystone, York / Louis Wawro, N3DYT, 374 Greendale Rd., York, PA 17403, 717-843-1921
Aug 18	Goleta, CA	Santa Barbara ARC / Marvin Johnston, KE6HTS, 408 Grove Ln., Santa Barbara, CA 93105, 805-682-1405
Aug 18	Golden, CO	CO State Conv / Guy Reed, W5GR, 29875 Troutdale Scenic Dr., Evergreen, CO 80439-7737, 303-674-5389
Aug 18	Georgetown, DE	Sussex ARA, Delmarva Hfst Assn / Tom McDugall, N3JRB, RD 6, Box 64A, Georgetown, DE 19947, 302-856-2938
Aug 18	Stickney, IL	DuPage ARC / Ed Weinstein, WD9AYR, 7511 Walnut Ave., Woodridge, IL 60517, 708-985-9256
Aug 18	Salina, KS	Central Kansas ARC / Dan Cook, AA0TT, PO Box 134, Enterprise, KS 67441, 913-263-8540
Aug 18	Cambridge, MA	MIT RS; Harvard Wireless Club / Steve Fineberg, W1GSL, PO Box 397082, MIT Branch, Cambridge, MA 02139, Nick Altemburnd, KA1MQX, 617-253-3776
Aug 18	Spec Event Stn	Ft Herkimer ARC will op KB2UYI, 1400-1900 UTC to commemorate Herkimer Co Fair in Frankfort, NY. Op ion 20m gen phone, 40m novice CW, 40m gen, 2m 145.110. Send QSL and SASE to N2WTF, John Reed, 617 Jeffrey St, Herkimer, NY 13350 for certificate.
Aug 18	Yonkers, NY	Westchester Emerg Comm Assoc / P.O. Box 831, N Tarrytown, NY 10591-0831, Tom (WB2NHC) or Jeanne (N2NQY) Raffaelli 914-962-9666. Location: Yonkers Raceway, I-87, Central & Yonkers Ave, 9am-2pm. Talk-in 147.06/66. \$6 admission.
Aug 18	Broadway, OH	Union Co ARC / Gene Moore, N8YRF, 24461 Claiborne Rd., Marysville, OH 43040, 513-246-5943
Aug 18	Warren, OH	Warren ARA / Al Van Slyke, N8IKX, 3931 County Line Tpke Rd., Southington, OH 44470, 216-889-3378
Aug 23-25	Weston, WV	WV State Conv / L. Ann Rinehart, KA8ZGY, 1256 Ridge Dr., South Charleston, WV 25309-2434, 304-768-9534
Aug 24	Bridgewater, NJ	Somerset Co ARS (SCARS) / Pete WA2OCN, PO Box 742, Manville, NJ 08835, 908-429-0903. Location: Somerset Co 4H Center, Milltown Rd. Talk-in 448.175-
Aug 24	Chaffee, NY	Pioneer Radio Op Soc / Mt. Gail I. Lewis, W2CRY, 9765 S. Protection Rd., Holland, NY 14080, 716-537-9570
Aug 24	Gainesville, TX	Cooke Co ARC / Doug Covington, KB5VKJ, RR 3, Box 75-3, Gainesville, TX 76240, 817-665-4924
Aug 24	Onalaska, WI	Riverland ARC / Dick Low, K0JYB, 1520 Nakomis Ave., LaCrosse, WI 54603, 608-784-9176
Aug 25	Danville, IL	Vermilion Co ARA / Gary Denison, KA9SKS, 14704 East 2750 North Rd., Danville, IL 61834-5610, 217-759-7389
Aug 25	Corunna, MI	MI State Conv / Jan LaBrenz, N8NSE, 1214 McKinley Ave., Bay City, MI 48708, 517-893-3475
Aug 25	Yonkers, NY	Yonkers ARC / John Costa, WB2AUL, 195 Woodland Ave., Yonkers, NY 10703, 914-969-6548; Jim N2ONM 914-969-5182. Location: Yonkers Municipal Parking Garage, Main St. 9am-3pm. Talk-in 146.865, 440.150. \$5 gen adm
Aug 30-31	New Orleans, LA	New Orleans Int'l DX Conv / Michael Mayer, W5ZPA, 5836 Marcia Ave., New Orleans, LA 70124, 504-486-6739
Aug 31	Alamogordo, NM	Alamogordo ARC / Larry Moore, WA5UNO, 1830 Corte Del Ranchero, Alamogordo, NM 8831, 505-437-0145
Aug 31	Hayward, WI	Namekagon Vly Wireless / Mary Lindberg, KB9LFF, 9316 East Evergreen Ave., Solon Springs, WI 54873, 715-378-2368



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One Feed Line—Three Antennas

Coaxial cable seems to get more expensive by the day. An SWL or a radio amateur can invest a substantial amount of money in RG-58 or RG-8 coaxial line if he or she has more than one antenna. The practical solution to this problem is to use one feed line and a manual or remote switching circuit that permits antenna selection at the site where the antennas are located.

Although commercially made devices for doing this are available, they aren't within the budgets of some radio enthusiasts. A home-made switch box is easy to construct and should not be expensive. This month we will explore simple ways to use three or more antennas with a single coaxial feeder.

Manual Antenna Selection

It is not unusual for a ham or an SWL to have two or three dipoles or verticals to ensure optimum reception for various parts of the radio spectrum, such as medium frequency, high frequency, and VHF. In a worst-case situation these antennas may be 100 or more feet from the radio room. This would require 300-plus feet of costly feed line. It would also necessitate bringing three cables into the house. None of us are anxious to drill holes in the walls of the family dwelling! One small hole would be a more appealing solution to the problem. Manual or relay-controlled remote antenna switching enables us to use one feed line, and hence drill but one entry hole in a wall of the house.

Figure 1 shows a circuit for manual remote antenna switching. It can, of course, be used for antenna selection inside the radio room, if you already have separate feeders routed into your house. A manual remote switch imposes an inconvenience, because

the operator must go out of doors to change antennas. This principle is acceptable if antenna switching is not a daily necessity.

Ordinary single-pole, multiposition rotary wafer switches are okay for receiving antennas. The switch insulation may be phenolic or ceramic. However, switches used for transmitting applications need heavier contacts and ceramic insulation. An excellent unit to use for RF power switching is an Ohmite power-tap switch. These can sometimes be purchased as surplus for as little as \$2. RF power switches should be mounted on a plastic block, such as Plexiglass. This prevents RF voltages from arcing to ground via the frame of the switch. Switches for receiving antennas need not be insulated from ground.

Switching with Relays

Two double-pole, double-throw miniature relays can be utilized to remotely select up to three antennas. A practical circuit is presented in figure 2. K1 and K2 are surplus 16-pin DIP relays. I chose 12-volt units because I have a 12-volt dc wall transformer which supplies ample current for my circuit. DIP relays of this type are available for other popular dc voltages.

K1 and K2 of figure 2 are suitable for use with receiving antennas. They may be used for transmitting applications up to 75 watts, provided the SWR does not exceed 2:1.

The relay logic allows selection of ANTENNA 1 when both relays are de-

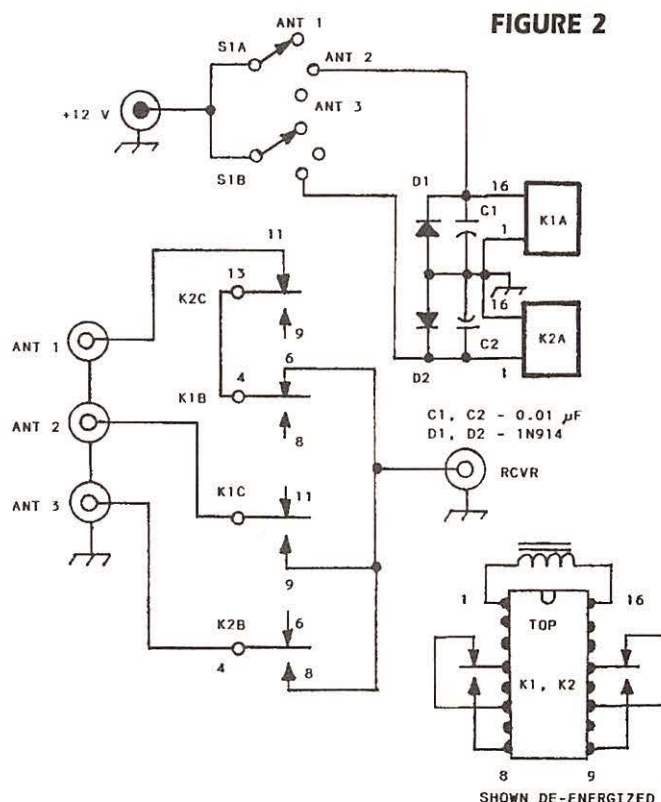


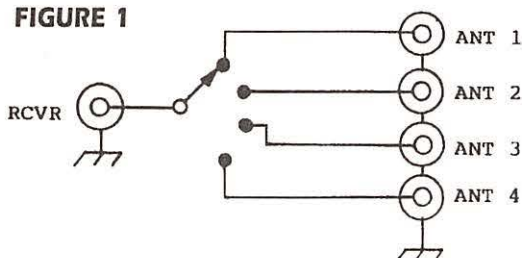
FIGURE 2
Circuit for a relay-controlled remote antenna switch that permits selection of three coax-fed antennas. C1 and C2 are 0.1 µF, 100-V disc ceramic. D1 and D2 are 1N914 diodes. For K1 and K2 use DPDT 16-pin DIP mini relays (see text). S1 is used inside the radio room, and is a double-pole, three-position rotary wafer switch.

energized. ANTENNA 2 is selected when K1 is energized, with K2 idle. When K1 is de-energized and K2 is activated, ANTENNA 3 is connected to the receiver or transmitter.

The dc power supply is located inside the house, along with relay control switch S1. A double-pole, three-position rotary wafer switch is used for S1. If you use the PC-board pattern in figure 3, make certain that the relay you purchase has the same pin-out shown at the lower right in figure 2.

Other styles of relays are suitable for use in the figure 2 control circuit. It is not necessary to build your assembly on a PC board. Point-to-point wiring may be used if the leads are kept reasonably short. Relays with larger contacts are best for RF power switching. Relays for the latter application should be

FIGURE 1



Example of a rotary switch type of antenna-selector circuit. S1 is a single-pole, multiposition wafer switch. See text.

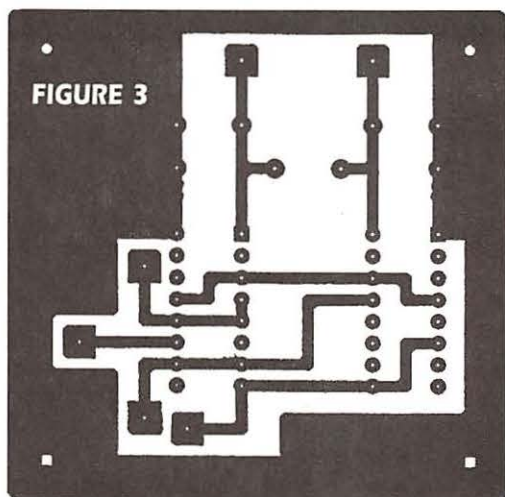


FIGURE 3
Scale etching template for the circuit in figure 2, as viewed from the etched side of the board. Etched, drilled and plated boards are available from FAR Circuits, 18N640 Field Court, Dundee, IL 60118. Phone: (708) 426-2431. Price: \$2.55 plus \$1.50 s/h.

mounted on plastic holders to prevent RF voltage from arcing to ground across the relay frames. Also, an RF choke made by winding 16 turns of no. 26 enamel wire on an Amidon Assoc. FT-50-61 toroid core, or equivalent, should be installed at each relay +dc terminal. C1 and C2 of figure 2 would then be connected to ground at the junction of each RF choke and its +dc control line (not at relay terminal 16). These chokes further isolate the relays from RF ground.

The figure 2 circuit can be enhanced further by adding two LEDs and two current-limiting resistors. The LEDs would be mounted on the panel of the indoor control box to indicate which relay is energized. Simply connect a 680-ohm, 1/2 watt resistor (for 12-V operation) to terminal 16 of each relay in figure 2. An LED is then connected between the remaining end of each resistor and dc ground. Select an LED color of your choice.

■ Construction Tips

Your relay circuit should be assembled in a weather-proof box. An enclosure can be made inexpensively from sections of PC board that have been soldered together to form a small box. After the circuit is tested and ready to use, the lid may be sol-

dered in place. If you use a removable lid, seal the seams with Coax Seal® or caulking compound. Likewise for the coaxial connectors, after the feed lines have been attached to them.

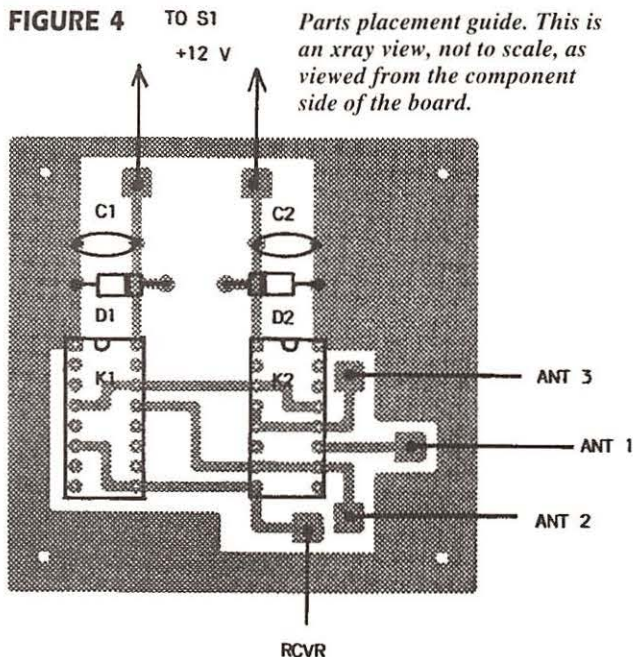
You may want to reduce the cost of this project by using RCA phone jacks (receive antennas only) for the connectors shown in figure 2. However, SO-239 standard coaxial jacks will ensure greater reliability and longevity, and are necessary for transmitting applications. Type F CATV connectors are fine for receiving antennas, too. BNC connectors may be used with receiving and low power transmitting antennas.

The control cable between the house and the relay box should be designed for underground service if you bury it. Cable that is not buried should have a UV-resistant jacket. The conductors need to be no. 22 or larger to prevent a voltage drop along the line if a long run of control cable is necessary.

Figure 4 shows the parts layout for the figure 2 circuit, as viewed from the component side of the PC board.

Various brands of DPDT 16-pin DIP relays are manufactured. Clare, GE and Ormon are among them. Check the All Electronics Corp. catalog for bargain-price relays.¹ New surplus relays often cost \$2.50 or less per unit.

Note 1 — All Electronics Corp., 905 S. Vermont Ave., Los Angeles, CA 90006. Phone: 1-800-826-5432 to order or for a catalog.



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BCB Rejection Filter

The Kiwa BCB (Broadcast Band) Rejection Filter is also sold separately. This filter is extremely effective for reducing BCB overload interference. The extremely sharp filter slope and low passband insertion loss distinguishes this filter from other designs. Input/output impedance: 50 ohms • -3 dB @ 1.75 MHz • -60 dB @ 1.2 MHz • Passband insertion loss: -0.5 dB @ 3.0 MHz

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Airport Ground Control

Welcome aboard. I hope everyone is having a great monitoring summer! Since the HF bands get a bit freaky (to put it mildly) with storms and the like messing up good reception this time of year, I spend more time listening to the VHF aero band. However, don't cancel out HF entirely; you occasional will find a good 'window' where some excellent reception may surprise you.

The look at the new ARTCC equipment and other topics promised for this issue had to be postponed. However, yours truly is going to be able to see it in action in a few weeks, so have patience!

If someone were to ask me which area of airport air traffic control was the most fascinating and varied, I'd have to say that Ground Control would win, hands down. There's never a dull moment there! Take the following, for example. This all took place at Indianapolis International Airport on Ground Control frequency 121.900 MHz.

(Ground Controller) "Good morning, Sunshine Air 42, taxi to your gate, but first give way to the American 727 crossing in front of you. By the way, what gate are you assigned today?"

(Sunshine Air 42) "Uh, we're not sure. This is our first time here. We're a charter from Portland, Oregon, here for the '500'."

(Ground Controller) "You don't know who's handling you? Well, who's your handler at other airports? Stand by one. - Break, TWA 3, you may start your push back; let me know when you're ready to taxi."

(TWA 3) "Roger, Ground. TWA 3's starting push back now."

(Ground Controller) "Sunshine Air, I say again, who handles you at other airports?"

(Sunshine Air 42) "Uh, well, we have contracts with different airlines at various airports."

(Ground Control) "Why don't you call your company in Portland and ask your dispatcher which airline you contract with here? In the meantime, you're blocking that taxiway; pull over to the runup area just ahead of you while you're sorting things out. Let me know when you do."

(Sunshine Air 42) "Roger, Sunshine Air 42."

(Delta 58) "Ground, this is Delta 58; there's a stuck mike on clearance delivery 128.750. Do they have another frequency?"



(Ground Controller) "Try them on 121.800, Delta 58." "Break, USAir 10, did you call?"

(USAir 10) "Affirmative. We have to go back to the gate and offload a passenger who decided that he didn't want to fly today. But, uh, company says there's no gate available right now, so we've got to wait until one frees up. Where do you want us to put our aircraft in the meantime?"

(Ground Controller, admirably stifling the first answer that comes to mind.) "USAir 10, taxi straight ahead on Alfa 1 to Romeo. Turn left on Romeo and then into the 'Penalty Box' while you're waiting for your gate. Advise when your dispatcher gives you a gate."

(USAir 10) "Roger, straight ahead on Alfa 1 to Romeo and the turn right on Romeo to the 'Penalty Box'."

(Ground Controller) "*Negative, Negative, USAir 10! When you get to Romeo, turn left!* There's a FedEx MD-11 who will be coming from the right and I don't think you want to have a ground incursion with him."

(USAir 10) "Sorry for the misunderstanding, USAir 10 is about to make our turn to the left on Romeo now."

(Ground Controller) "Roger. Break, TWA 3, did you say you're ready to taxi?"

(TWA 3) "We're pushed back, but we're still waiting for our numbers (*weight, balance, etc. -jb*)."

(Ground Controller) "TWA 3, clearance delivery just informed me that you have a release time of 1440, void if you're not wheels up by 1445. Is there going to be any problem with that?"

(TWA 3) "No, we've got our numbers now and are ready to taxi now."

(Ground Controller) "Roger that. Taxi to runway 23R via taxiway Sierra to Mike, turn right on Mike and then contact Tower on 120.900. Have a good trip."

(TWA 3) "Roger, TWA 3 taxiing Sierra to Mike; contact Tower on 120.900. Good day."

We could go on and on, but you've probably gotten the idea by now.

Remember, if you live within 10 - 12 miles of an airport with tower and ground facilities, you can probably hear them on your home scanner. However, if you live further away, you might want to take your handheld scanner and spend a few hours at the airport.

Ground control is usually found in the frequency range of 121.600 - 121.975 MHz. That's not a hard and fast rule for every airport; some ground control facilities may use other freq. ranges. If you don't know what frequency ground control uses in your area, call the Air Traffic Control Tower and ask, or write to me and I'll find out for you.

■ Murphy's Law in Action

A few months ago, an airliner flying from Chicago to St. Petersburg, Florida, was about 40 minutes out of Midway when it suddenly lost cabin pressure. The captain made an emergency descent from flight level 330 to somewhere between 10,000 and 14,000 feet (also called a "slam-dunk" by airline personnel), and then radioed Indianapolis requesting an emergency landing. The landing was uneventful, no one was seriously injured, and most passengers transferred to another aircraft.

Later that same evening, the disabled 727's engines and cockpit voice recorder remained running while mechanics inspected the aircraft. A spokesperson for the airline said "We have some very interesting conversations between the mechanics — because they taped right over the loop!" The spokesperson added that the mechanics could have pulled a circuit breaker to stop the recorder from taping.

The cockpit voice recorder (CVR), which runs on a continuous 30-minute loop, and the flight data recorder had been quarantined by the NTSB (National Transportation Safety Board), which is investigating the cause of the decompression incident. The mishap unfortunately negated one of the investigative tools they would have had to work with. Also, the FAA has a policy which says "After accidents, preservation of the cockpit voice recorder and flight data recorder (also known as the 'black box') is a priority."

That's all for today. Join us next month for more aero monitoring info. Until then, 73 and out.

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Towers? I don't see any towers ...

You all know how I enjoy a mystery, and we seem to have another one growing up under our noses here in the southeastern United States. The mystery involves the tower you see in the attached photograph. The tower is a couple of hundred feet tall—not much for a land-based structure, but this tower sits on top of a poured waterproof concrete pedestal approximately one hundred feet tall. The bottom of this pedestal is firmly embedded in the Gulf of Mexico far from any land—except Cuba.

A friend of mine, who has reason to know about such things, discovered this site. He discovered three towers, in fact, located right out in the Gulf of Mexico midway between Key West and Fort Jefferson (the site of a Confederate prison camp). There is a Civil War cemetery there and until recently, a couple of very interesting remote receiver sites for high frequency monitoring. It is unimportant who operated them. With the recent budget cutbacks, they are gone now.

My friend, who had to make "official" trips out that way, came across the towers about 30-35 miles from Key West. They sit about a mile apart. They are all equipped with little houses at the base of the towers, which is approximately one hundred feet above the water line. On the towers is a nest of antennas, with microwave antennas pointing between the towers and back to Key West.

Inquiries into who built the towers turned up nothing. Finally, a fisherman who is constantly in those waters told a story of a rather large U.S. Navy vessel which dropped anchor one day in the vicinity. Shortly thereafter, the three concrete pedestals were "growing" out of the Gulf of Mexico. The next fishing trip (no pun intended) revealed the radio towers built on top of the pedestals. The two way antennas and the microwave dishes soon followed.

All attempts—"quasi-official" and otherwise—have drawn a blank as to who, what, etc., the towers are for. It is known that a U.S. Air Force launch (the boat, not the rocket) goes out to them once a week for maintenance. The Air Force has no comment on this. I contacted a friend of mine in the Coast Guard who would know about such things. He told me that they were aware of them, but they were a "hands-off operation." He did let it slip, intentionally or otherwise, that there is an

identical set of these towers in the Gulf of Mexico south of Eglin Air Force Base at Panama City, Florida. They, too, are "hands off."

Are these remote receiver sites, operated by the Naval Security Group at Key West? Are they remote two-way bases for communications with the military over the southeast Gulf of Mexico? I don't know. Another trip is planned down that way with a little better photographic interception equipment. If the antennas can be identified, then perhaps the frequency range, agency, use, etc., can be determined.

■ More Grist for the Mill

It has been rumored that the Naval Intercept Group at Key West is closing. This Naval Intercept Group is located on the south end of the southernmost island on a government compound. It has nothing on it except a lot (and I mean a lot) of antennas looking straight at Cuba. I have seen a good number of intercept antennas in my time, but there are some down there that I have never seen before. The antennas range from the low VHF (30 MHz range) up to microwave dishes.

I hate to give Fidel Castro credit for anything, but one thing he effectively did was to bring communications to the island. Fidel discovered the power of radio back in the days when he was in the mountains of Oriente Province with an old amateur transmitter, broadcasting to his revolutionaries in the mountains. His tactic worked, as evidenced by the outcome.

Once in power, Castro made sure that any state business (i.e., any business) that needed it had radios. If you live in the southern United States, you can hear the Cuban farms, with their repeaters in the 30/40 MHz band, harvesting the crops.

Another successful project was Cuba's establishment of a nationwide microwave radio relay system. There is practically no point

on the island that is not covered by the terrestrial microwave system. One would assume that a lot of government communications travel on the microwave links as well. Can you see where this is leading?

Monitoring a microwave link 90 miles beyond its intended receiver is no major feat—especially when that 90 miles is across warm water. Are we monitoring Cuban microwave transmissions?

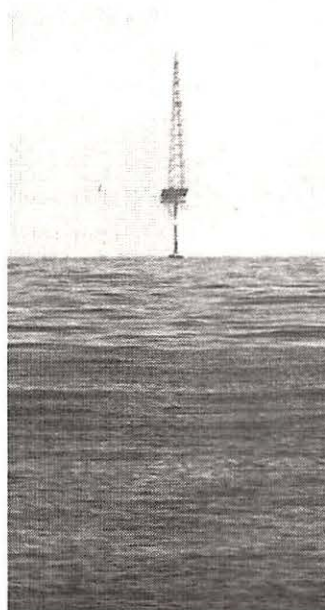
■ Is there a Remote Connection?

One of the most public, but least known aspects of the Central Intelligence Agency is the Foreign Broadcast Information Service (FBIS). Like the BBC Monitoring Service, this agency monitors the public broadcasts of other countries on long, medium, and short waves (and publishes reports to which the public may subscribe).

What has this to do with government radio monitoring? Well, the FBIS is closing its Key West office. The Naval Security Group is rumored to be closing its Key West office. The FCC already closed its offices.

The equipment at the FCC flagship station in Vero Beach is gone. However, the equipment at the FBIS office at Key West will be left in place and will be remotely operated from a thousand miles away in Panama City. U.S. Coast Guard CommStation Miami is remoted from CommStation CAMSLANT at Chesapeake, Virginia. Are we moving to a big remote operations center at Master Control? I don't know, but it sure looks like a trend is forming.

Can I provide frequencies of operations for you to monitor at some of these locations? Unfortunately, no. You won't be hearing any of the classified operations being discussed on the two-way. The most you will hear is the shore patrol, military police, or a few other units at these areas. The FBIS used to be an exception to this—they had CB radios in their



cars the first time I saw them in Key West twenty years ago. I guess now they are all using cellphones.

■ Use it so we don't lose it

And now—in the words of Monty Python—for something completely different.

Let's turn to the case of our British scanning cousins. I had an interesting piece of email from one who wishes to remain nameless. He passed along the same story told by Larry Miller in this month's "Communications" (see page 6). The article, entitled "Hackers Hand Out Royal Radio Codes," was written by Johnathon Leaks and John Davidson for the *Sunday Times*, and it starts out with the statement that the lives of the Royals and senior politicians are being put in jeopardy by radio hackers. It seems these "hackers" are people who have purchased scanners from radio shops and have gone as far as publishing lists of frequencies used by the "secret police operations" of those protecting the lives of the Royal Family and senior political officials.

Two groups of thought come to light here. Mr. Bill Hughes, a senior Yorkshire police official and a member of the technical and research committee of the Association of Chief Police Officers, made a statement that information was being provided to criminals and terrorists. By monitoring these frequencies, terrorists can predict every move of protected persons. The Monarchy and perhaps even the entire United Kingdom is in peril by allowing people to monitor official broadcasts.

The members of PROMA (Professional Radio Operators Monitoring Association) take a different viewpoint. They stated that secure radio systems have been available for years but have not been used by the authorities for several reasons, such as cost cutting measures and the inertia to make the move. Instead, the Wireless and Telegraphy Act of 1949 makes it illegal to listen to anything involving military or emergency services.

Here's an example of the futility of such legislation: The first time that I was in the United Kingdom I made an interesting discovery. The car radios tuned up to 108 MHz on the FM band, even though the FM broadcast band in the United Kingdom stopped at 104 MHz. What was in the other 4 MHz?

The first thing I found was the London Fire Brigade at 106 MHz. However, the most surprising transmissions were found on approximately 108.5 MHz. There I could listen to MI5 (the British equivalent of the FBI), tailing Soviet Bloc agents through Greater London! (They have moved their operations into the 140 MHz band now, so I am not giving away any "state secrets.")

That could never happen here, you say? Just as in the U.K., the technology for extremely secure communications has been available for years. Now channel hopping radios and spread spectrum are even becoming available to the public. However, our government has often either neglected to purchase the equipment or has purchased it and does not use it. How many times do we monitor DEA, Secret Service, Customs, etc., running very sensitive traffic with the speech encryption turned off? The best joke is when one side has the speech encryption turned on and the other unit has it turned off.

With all of the heightened awareness in this country regarding terrorist groups and activities, it's conceivable some of our elected officials might try to have monitoring made illegal here, as it is in the United Kingdom. Such legislation is not only futile, it's unnecessary. If we want to keep something private we have that capability. So do our British Cousins—but one has to operate the little switches on the radio.

■ Sites in the Open

- A web site that was brought to my attention is on the National Security Agency, the result of an excellent investigation by the *Baltimore Sun* newspaper. It can be found at <http://www.sunstore.com/sunsource/nsag4.htm>. It is entitled "Intelligence Sources On the Web." Full reprints of the *Baltimore Sun*'s entire NSA series are available at \$6.95 from the *Baltimore Sun* Information Store at (800) 829-8000, ext. 6800.
- Information comes to me every month from various sources. Some of it is snail mail and email, some of it is fax, and some of it I have to go out and find. I am constantly "surfing the Net" looking for new sites which have radio monitoring information. One of

the sites which I listed in the June 1996 article on electronic surveillance is maintained by James Atkinson at <http://www.tscm.com> (sorry, it was misspelled in the article). As I mentioned at the end of the article, this was the source of a good portion of the information in the column.

I did not mention that this site (and most other commercial sites), has copyright protection on its material. I wish to apologize to James for not making it clear that the information came directly from his site and must be used with permission. This attractive site contains an enormous amount of countersurveillance information, and I encourage you to check it out.

Remember, frequencies are public domain. The way that they are presented is the copyrighted information. All the frequencies at the Grove site are public information—the site itself and the material on it is copyrighted. Thanks to James Atkinson for being a good sport about it and calling this to my attention.

The Communications Expo is coming up soon in Atlanta. Hope to see all of you there.

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Repairing TVRO Gear

No amount of careful planning can prevent it happening. Sooner or later your satellite TV equipment, regardless of how well it's made and maintained, will be in need of repair. This month we'll look into damage, how to effect repairs, who to call when you haven't got a clue, and who should pay.

■ Damage Assessment

First we have to distinguish between component failure (which is a warranty issue between you, your dealer, and the manufacturer) and genuine damage (for which the manufacturer cannot be blamed, but the component, while still possibly under warranty, needs to be replaced).

In the case of component failure, hunt for your warranty card and sales slips and determine if it's under warranty. If it is, the usual procedure is to return it to the dealer for replacement. If the dealer is a mail order firm, call their toll free number and ask for warranty replacement instructions. Usually, you'll be assigned a Return Authorization number (RA#) and told how to ship the defective part.

TVRO gear can be damaged any number of ways. However, the most common source of damage is weather related. Falling trees can destroy a dish, mount, feed assembly, or, depending on the severity of the wind, all outdoor components. Lightning can damage outdoor components but usually only the LNB is at risk. Most such damage occurs when lightning surges through the household AC power lines. When this happens, all manner of damage can occur. In addition to your TVRO gear, you may also lose your VCR, TVS, stereo, and anything else which is connected.

If you can, assess the apparent amount of damage. For instance, if a tree falls on your dish, there's no way you're going to be able to bang it back into a true parabola; it needs to be replaced. That will likely be more than the deductible for a claim on your homeowner's insurance, so a call to your local insurance agent is your first step.

■ Do-It-Yourself Repairs

In the case of out-of-warranty repairs, you may be able to avoid big bills by doing the work yourself. Now, I'm not talking about getting out the soldering iron and opening up

your LNB. If your field of expertise includes such work, be my guest. But, if you're like the rest of us, you'll be lucky to be able to just swap out defective parts. This is not a hard job. Satellite dealers often charge \$50 per hour plus transportation to and from your location, so becoming familiar with such basic procedures as replacing a defective LNB will really pay off. Read all manuals!

If your system fails and it coincides with a weather related event, anything is possible. Troubleshooting should be routine: Check to see that everything is plugged in where it should be and that all connections are good. Check to see there is power on the electric circuit you're using. Check to see if power-off defaults need to be reset. For example, with my system the VCR, on which I view the satellite signal, automatically defaults to channel 2 in the event of a power interruption. This means that following a power outage there is no apparent satellite signal on the TV. The picture is restored merely by retuning the VCR to channel 4, the output of the satellite receiver.

One really cheap but useful tool for testing your system is a small volt meter. The handiest of these are the digital reading meters such as the Radio Shack catalog number 22-179, which is a small autoranging meter sometimes on sale for less than \$20. A small number of hand tools are required for doing most dish related repairs: a socket wrench set, an adjustable crescent wrench, an assortment of Phillips and slotted screwdrivers, wire cutters, and cable fitting crimpers (I recommend RS catalog #278-243).

Testing the voltage on the feed line from the receiver out to the LNB or on the wire to the servo motor on the feed horn can help determine if a component or a cable is at fault. Look at your equipment manuals to determine proper voltage amounts for either. Test for shorted coax by putting the meter across either end of the cable between the conductor and the ground.

■ When All Else Fails

Sometimes you may feel you have no recourse. You may have inherited a TVRO system in the house you just bought; your

The most common source of TVRO damage is weather related.

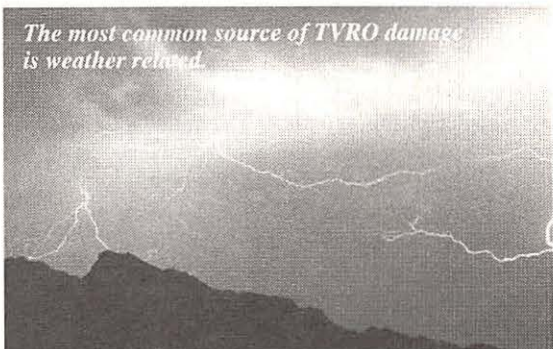


Photo by Warren Faidley, Weatherstock

dealer or even the manufacturer of your system components may have gone out of business; you may have picked up an irresistible component at a hamfest only to find it doesn't function. Whatever your reason, help is available.

There are dealers in every city who specialize in warranty and out-of-warranty repairs. These shops often have extensive files of schematics for hundreds of receivers and LNBs, many of which haven't been in production in ten years. If the parts for the necessary repairs can be found, virtually any TVRO component can be repaired. Sometimes, manufacturers used special chips or I.C.s which are no longer made and without which a repair can't be made. In these instances you're out of luck.

If you don't live near enough to reputable repair facilities, there are mail order repair shops which may be able to help. I have compiled a list of such companies (which is neither complete nor intended as an endorsement of their services). Call ones closest to you first, since you'll be paying the shipping both ways on a repair. Call as many as you can and get estimates; you may be surprised at the differences in price. Some companies even offer DSS system repairs as well as fixing broken remote controls.

Companies doing out of warranty repair work usually have a flat fee schedule for all components, for instance, LNBs might be a flat \$50, receivers may be a flat \$80 plus parts. Each company has its own policy and may or may not include return shipping in the charge. All of these factors should be calculated to determine the cheapest. Of course, the cheapest may not be the best, so *caveat emptor*.

Sometimes manufacturers will take old equipment in trade for factory serviced mod-

els and charge considerably less than full price for a new one. You'll also typically get a 90 day warranty. Call the manufacturer, if they're still in business and ask.

For the die-hard do-it-yourselfer there are two books which should be of interest. Baylin Publications offers *Home Satellite TV Installation and Troubleshooting Manual*. This 325 page, 8.5 x 11 inch book has over 300 illustrations, photographs, tables, and appendices and is also available in Spanish and Portuguese editions. Retail price is \$30 plus shipping. You may order it directly from the publisher at 1905 Mariposa, Boulder, CO 80302 (phone: 303-449-4551) or from the *Grove Catalog and Buyer's Guide* (order line: 800-438-8155).

The other book is a technical repair manual called *Repairing Satellite Equipment (The Insider's Notebook)* by Brian Hoopsick and Rich Ford. Published by Brich & Associates, this is a technician's repair manual for many makes of satellite TV equipment, including those no longer in production. This 120 page book is the result of more than 10 years of doing repair work in the field. Published in 1994, there are two annual updates available for '95 and '96, each 60 pages and available separately. The book is \$79.95 plus \$10 shipping and the annual updates are \$29.95 plus \$5 shipping.

This is not an installation manual, but intended for the professional technician or the advanced hobbyist with an interest in repairing equipment. Look for a review of this book in next month's column.

■ Who Picks Up the Tab?

In the case of insurance claims, the insurance company will call all the shots. Typically, they have an arrangement with a qualified dealer who does their claims work. This sometimes becomes a problem. I've known instances where the preferred dealer is either not competent or entirely overworked. The result is that repairs may be done improperly

and/or take an inordinate amount of time. This is especially true when, in the wake of a violent thunderstorm, dozens of systems go down at once and the one repair outfit has to fix them all.

In the case of non-insurance component failure, the dealer usually absorbs all costs. This is because they are being reimbursed by the original manufacturer. In the case of a dealer going out of business before the component fails, the manufacturer will still honor the warranty but you have to deal directly with them.

If you've bought a used system or have had your system for many years, you will have to pick up the tab yourself. At this point it might be worthwhile to determine if it's worth repairing the part or buying a new one. If, for instance, you have an older 80 degree LNB it is probably worth buying a new one, since the newer models have much lower noise figures and will be under warranty. The cost of repairing an older less efficient LNB will be about half the cost of a newer, better LNB with a warranty. It's your money.

■ Transponder Notes

- Hughes Communications had a successful launch on May 23 of its Galaxy 9 satellite and deployment of its solar panels on June 5. Following a shaky launch schedule which had many cable interests more than a little nervous, the new bird has taken up its new position at 123 degrees west. It replaced the aging Telstar 303 satellite on June 15 and adds to the bulging "cable neighborhood" of Satcom C1 at 137 degrees, Satcom C4 at 135 degrees, Galaxy 1 at 133 degrees, Satcom C3 at 131 degrees, Galaxy 5 at 125 degrees and Galaxy 9 at 123 degrees.

Note that with the exception of G5 and C3 all conform to the 2 degrees spacing. That means that there is still room for two more cable birds in this neighborhood. Galaxy 9 has on-board 5 channels of pay-per-view movies, The Sundance Channel, Showtime West, Nickelodeon West, Movie Channel West, MTV West, NHK, The Computer Network, and twelve other channels yet to be announced.

- Latest industry analysis indicates that DirecTV leads the DBS race with 1.4 million subscribers compared to PrimeStar's 1.1 million and Full View C-band with 2.3 million subscribers. Of course, that doesn't count the number of systems in use which do not subscribe to any scrambled channels. Total subscription satellite universe is at 5 million. Poised to join the DBS fray is AlphaStar which hopes to be counted in the tally by the end of summer.

With USSB, DISH, PrimeStar, and DirecTV already billing customers, the DBS playing field is beginning to get crowded. It remains to be seen if a price war will cause unit prices or subscription fees to fall. At present there appears to be an unwritten agreement to hold the line on equipment and subscription services.

TABLE 2: Component Manufacturers

Actuator Manufacturers	
Ajak Industries	719-784-6301
Pro Brand International	404-423-7072
Prosat of America, Inc.	714-261-2204
SRS	517-697-3624
Thomson Saginaw	517-776-5111
Venture Mfg. Co.	513-233-8792
Feed Horns	
Astrotel Communications	310-403-7036
California Amplifier	805-987-9000
Chaparral Communications	408-435-1530
National ADL Enterprise	805-526-5249
Pico Macom	800-421-6511
LNA/LNB	
Aspen	415-543-8282
Astrotel Communications	310-403-7036
California Amplifier	805-987-9000
Chaparral Communications	408-435-1530
DX Communications	914-347-4040
Gardiner Communications	214-348-4747
Houston Tracker Systems, Inc.	303-790-4445
Norsat International, Inc.	604-597-6200
Pro Brand International	404-423-7072
R. L. Drake Co.	513-746-6990
Receivers	
Channel Master	919-934-9711
Chaparral Communications	408-435-1530
DX Communications	914-347-4040
EchoStar Com., Inc.	800-521-9282
Fujitsu General	201-575-0380
General Instrument	619-455-1500
Houston Tracker Systems, Inc.	303-790-4445
NextWave Communications	800-785-NEXT
Norsat International, Inc.	604-597-6200
Panarex Electronics	818-768-5161
Panasonic Communications	201-348-7846
Tee-Comm	305-477-3298
Toshiba America	708-541-9400
Uniden Corp. Of America	817-858-3300
Zenith Electronics	847-391-8805

TABLE 1: Satellite Repair Services

Advanced Entertainment Systems	209-251-5111
All Systems	717-272-7300
Best Reception	423-523-6700
Birdview Satellite Services	816-252-2030
Centennial South	305-634-8800
Digicom Electronics, Inc.	800-344-4911
Houston Tracker Systems, Inc.	303-790-4445
Pacific Satellite	707-226-7714
Professional Satellite Repair	814-342-5635
PTS Corporation	812-824-9331
Receiver Repair Corp.	314-428-3330
Satellite & Sound	214-226-1865
Satellite Technologies, Inc.	800-872-1683
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Have you priced out panel voltmeters and indicators recently? You probably won't wheeze or develop a case of hives, but at those prices, you won't incorporate them into very many of your projects around shop and shack. You can build your own "digital voltmeter" a lot cheaper, though, and the one I have in mind can be used in a wide variety of applications as a fairly precise indicator or as a "smart idiot light."

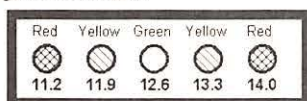
The September 1993 Experimenter's Workshop column featured an LED S-Meter circuit, the basics of which becomes this month's project, except that it can meter almost anything, from the electrical system in your car to any critical or variable DC voltage. It can even serve as a "smart" controller to turn things on or off, depending on input signal voltage. This means alarms, lights, machinery, etc. The primary focus this month will be on using the LED Voltmeter to monitor a vehicular electrical system in terms of Low-OK-High.

Battery Status Monitor

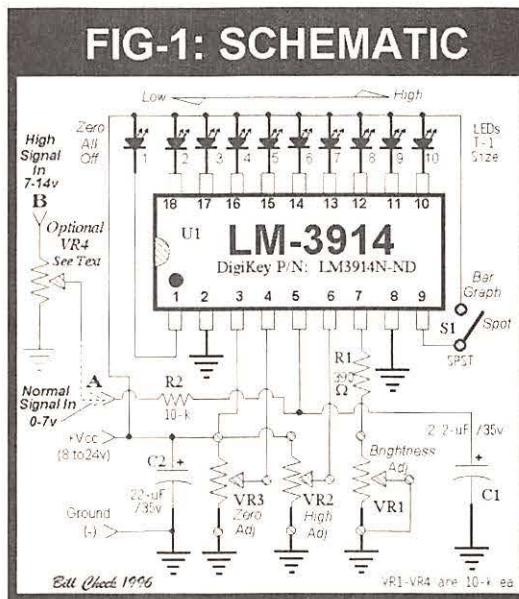
Battery powered equipment is a prime candidate for the LED Voltmeter, but a fantastic use for it is as an electrical system monitor for your car, truck, motorcycle, or boat, where battery condition can be vital to life, limb, welfare, and security! When you depend on a vehicular battery, three possible conditions are important to you: low charge; normal charge; and overcharge. The LED Voltmeter offers "idiot light" simplicity with three colors of LEDs as follows:

Green = normal (good!)
Yellow = caution
Red = danger

The below array of T-1 size LEDs (3-mm or 1/8" dia) can be mounted (2/10" apart on center) almost anywhere in a dashboard, panel, or equipment chassis:



This array of LEDs can display a range of 14+ volts on the high side to 11.2 volts on the low side with 12.6 volts lighting the green or normal LED. The yellow LEDs indicate 11.9 and 13.3 volts, respectively. Not to worry, though, if you prefer some other range of



indication because the calibration adjustments in the circuit allow almost any combination of display values. The normal, healthy status of lead-acid batteries is 12.6v for most vehicular batteries. The normal non-destructive recharge voltage of such batteries is 13.8v and high charge is 14.4v.

A battery is in danger of discharge when it falls below 12v. You can design your own indicator for any application with this idea in mind.

About the Chip

The LM-3914 Dot/BarDisplay Driver IC is the heart of our circuit, and requires only a few external components to make a full fledged "digital" voltmeter. The LM-3914 senses analog voltage levels and drives up to ten LEDs, LCDs, or fluorescents. It operates from a +Vcc of less than 3v to 25v. The chip has ten output pins, each turned "on," in sequence, as voltage rises. The increment from one output to the next is about 10% of full indication, which is extremely scalable by the proper choice of input and calibration resistors.

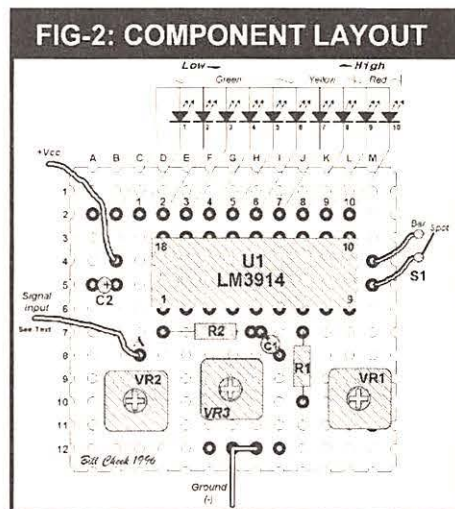
Any single LED output, or a combination of two or more, up to the full ten outputs can be used, each independent of all others. The LM-3914 offers a dual (switchable) mode display of either "spot" (moving dot-one LED on at a time) or continuous "bar graph." Brightness or current through each LED can be

adjusted from about 7-13 mA. The chip safely dissipates up to a max of 1.3-watts so long as it is operated at normal room temperatures.

About the Circuit

Our circuit is more complex than necessary in order to afford the hobbyist the ability to adjust it for a wide variety of signal ranges and power supply voltages. Fig-1 shows the full capability circuit. Fig-2 shows the component layout for either a perfboard construction or a printed circuit board. Fig-3 depicts the wiring side of the board. Figs 4-5 are printed circuit patterns, mirror and normal, respectively. Figs 4-5 are not to scale, but can be proportionally enlarged or reduced for standard IC pin spacing of 1/10th inch.

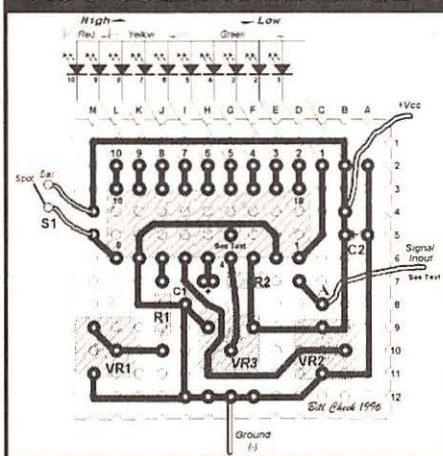
Fig-6 shows a pattern for a perfboard or PCB strip on which to mount up to ten LEDs. Like Figs 2-5, it is not to scale, but vertical hole spacing is 1/10" while horizontal hole spacing is 2/10" to allow the LEDs to fit comfortably, side by side, to form a row. You need not use this entire strip if less than ten LEDs are to be used. Just cut off what you don't need.



VR1 adjusts brightness of the LEDs. R1, a fixed resistor, limits maximum LED current when VR1 is turned all the way up. VR2 adjusts the "full scale" value for the point at which the 10th LED is to be lit. VR3 adjusts a relative zero value, above which the 1st LED just comes on.

Note: VR4 is optional and is not needed in

FIG-3: SOLDER-WIRING SIDE



normal cases where the input signal is 7v or less. The input for normal signals of 0-7v is at Point A in Fig-1. If signal levels are 7-14v, use VR4, with signal input at Point B, the output of which connects to Point A. VR4 is not required all that often, so the perfboard and PCB designs do not account for it. If you need VR-4, superglue it to a handy place on the board and hardwire it to the circuit as shown in Fig-1.

C2 filters the supply voltage line to prevent oscillation and flickering. C1 filters the signal line for much the same purpose. R2 helps prevent overvoltage or out of range signal level conditions. S1 allows switching from dot to bar-graph mode.

Note: "Dot" mode is more conserving of power, since only one LED is on at a time. This can be vital when the circuit monitors NiCd cells or other low energy sources. Fig-1A shows a +8v regulator circuit that can power the circuit for special requirements. Otherwise, most any DC source of 5v to 24v is fine.

■ Auto Battery Indicator

The LED Voltmeter makes a great electrical system monitor for a vehicle. Radio hobbyists and pro's alike routinely use mobile communications, often without the motor running. Radios don't normally drain the battery at a high rate, but over time, a battery can be discharged enough that it can't start the motor. A status monitor like this one can be an asset to emergency communications or when DXing from your car.

Build the circuit as shown in Figs 1-3, including Fig 1A. VR4 is required since you'll be monitoring a 12v electrical system. The +8v regulator can be mounted on the board with a little ingenuity and an additional hole or two. If the regulator is then mounted to a grounded plate somewhere under the dash, everything can be out of sight and out of mind, with a good heat sink for the regulator at the same time!

Connect the input of the 7808 regulator and Point B of Fig-1 together, and to a switched side of the 12v electrical system, or go through your own switch to an unswitched side of the 12v system. S1 (Figs-1-3) is not required, since the Spot function is required. Use five

LEDs as previously discussed, connected to LM3914 Pins 15-11 (Outputs 5-9). Mount the LED strip in a visible location and run a 6-wire cable bundle from the strip back to the board.

■ Setup and Adjustment

Preset VR1-VR4 to the middle of their range. With a regular voltmeter connected to the 12v power line and the

battery at a normal 12.6v, adjust VR2 so that only the middle LED is lit. Adjust VR1 for desired brilliancy. Then it will require a repeated series of adjustments of VR4, VR3, and VR2 to establish the min-max range of the five LEDs for 11.2v - 14.0v. It would help to be able to do this on your test bench with a variable power supply so as to get it "right" before installing the circuit in your vehicle.

■ Hints - Tips - Kinks

The LM-3914, and its sister chip, the LM-3915, are well worth getting to know. I have data sheets for the curious for the \$1.00 (ea) cost of mailing and reproduction. A little experimenting before using the LED Voltmeter in a serious application will increase your understanding of how it works and how to adjust it. "Play" with it a while so you can "open up your mind and let your fantasies unwind," quoth the Phantom of the Opera, a well-known radioist of the 19th century.

■ Computer Upgrade Update

Nov-95 to Feb-96 we featured a series on upgrading or "rolling your own" personal computer. A number of readers have since inquired about a source of the versatile R407e 486 motherboard, saying that the original outlet I specified didn't carry them anymore. Here's one that has the R407e with an AMD 486DX4/100 CPU for about \$150:

Mega Micro, Inc.
8303 Clairemont Mesa Blvd; #101
San Diego, CA 92111
(619) 573-0040 (619) 735-3201

The 486 CPU is rapidly becoming an outdated technology, but in my opinion, the 486DX4/100 in the robust R407e VLB motherboard has more power than the hobbyist will ever extract. The low cost and the simplicity of upgrading or building around this board and CPU are unmatched, even though Pentium upgrades are very attractive now. I still use three of these boards and CPUs, and it really doesn't bother me as I alternate among them and the Pentiums in my work center. Yes, the Pentiums are better — but the 486's still pleasantly do everything I ask of them.

Other ways to contact Bill Cheek:
BBS & FAX: 5:30-1:30 p.m. PDT: 619-578-9247
CompuServe: 74107,1176;
World Wide Web: <http://ourworld.compuServe.com/homepages/bcheek>;
FTP: <ftp://ftp.cts.com/pub/bcheek>

FIG-4: PCB - MIRROR

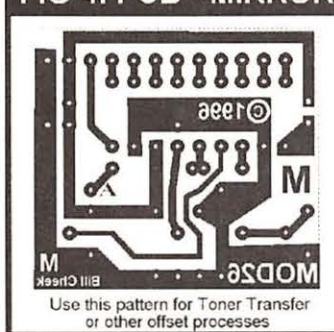


FIG-5: PCB - NORMAL

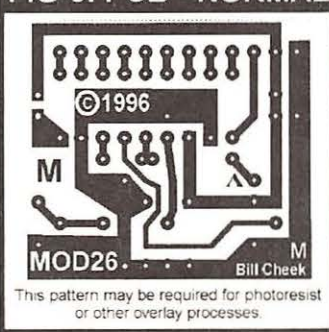
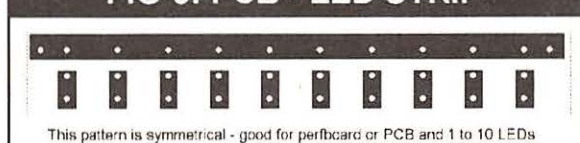


FIG-6: PCB - LED STRIP



Wireless Web Access Requires Allocation

The Federal Communications Commission has proposed rules for allocating a frequency band for unlicensed usage to bring the Internet via radio to libraries, other public facilities, businesses, and individuals. This new "NII Band" would extend the National Information Infrastructure to people who currently cannot access it.

The idea was first proposed in May 1995 by Apple Computer, who asked the FCC to allocate 300 MHz for unlicensed wireless devices. "This would revolutionize the way in which many Americans work, learn and communicate," says Dr. Gilbert F. Amelio, chairman and CEO of Apple. The proposed band would enable the public to establish low-cost links to each other and to informational resources via the Internet.

"NII Band operations won't replace licensed wireless technologies," says Jim Burger of Apple, "because the physics of radio (limit) distance and coverage." The NII Band, he says, would complement existing carriers and stimulate traffic for them by introducing more people to wireless communication.

A perfect marriage: cellular phones and laptop computers

Soon you'll be able to plug your laptop computer into your cellular phone and surf the Internet, do email and faxes, and access other computers including yours at home from anywhere, including a client's office, your hotel room, the golf course, or the beach.

One such service, provided by Cellular One, is already available in the San Francisco area, and is expected to migrate quickly to other parts of the nation. There is no charge to customers beyond regular air time rates.

Cellular One is a partnership of AirTouch Communications, of San Francisco, and AT&T Wireless Services of Kirkland, Wash. Their new service is called AirWorks, a trademark of AirTouch.

Basically, here is how it works. You plug your laptop into a connector on the phone, which has a built-in modem. You then dial a special prefix plus the number of the target modem or online service. The prefix connects the modem in your cellular handset with a local cellular "modem gateway" which in turn links your computer to the target.

It's done through a Cellular Circuit

Switched Data (CCSD) service. "Circuit switched" refers to the method of connecting modems.

Right now AirWorks is available only in the Greater San Francisco region where its gateways are located. But customers who venture outside of that local calling area will probably still be able to transmit data without going through the gateways, because many cellular carriers support CCSD technology.

Cellular One is developing another wireless data service based on "packet" technology. That term is familiar to ham radio operators who use it to send digital messages via radio transceivers. The cellular phone version is called Cellular Digital Packet Data (CDPD) technology. Similar to its amateur radio cousin, CDPD enables cellular users to send high-speed pulses of data from their computers via phone connections. It is useful for sending and receiving email, credit authorization, and similar message traffic.

Cellular phones are going digital

AirTouch Communications has introduced a new digital cellular phone service which promises improved quality, increased privacy, and longer battery life.

Their new Powerband service converts analog telephone signals to digital, which allows them to be transmitted more efficiently. "This is a fundamental shift in the way people communicate," says Irwin Jacobs of QualComm who makes handsets for Powerband use. The new service is ideal for telephonic data transmission.

Powerband uses Code Division Multiple Access (CDMA) technology. It supports voice mail, digital paging and text messaging, but soon will add other features including email via the Internet.

The service is being provided first to AirTouch customers in California's San Fernando Valley northward to Ventura. It is to be expanded throughout most of Los Angeles by year's end, and ultimately to other major cities nationwide.

American Airlines adds seat phones

By the end of this year, more than 600 American airliners will be equipped with digital phone consoles in passenger seats. Installation has already begun, and in fact has been

completed in many of American's passenger jets. These AT&T systems give passengers full digital air-to-ground voice and data communications while airborne, including fax and computer data transmission capabilities.

The systems were installed a few at a time on airliners experiencing eight-hour layovers, says Bruce Wright of AT&T's aviation communications division which did the installations.

"Seats were taken off the planes. The seats were modified and installed with handsets. Distribution cabling had to be run throughout the aircraft. Radio and telephone electronics were installed in the belly. Antennae were attached to the undersides of the aircraft. Electrical breakers and more circuitry had to be added to the cockpits to support the systems," he explains.

AT&T Wireless Services says its air-to-ground digital telephone network is the largest such system in North America with 140 ground stations, and with commercial contracts with every aviation satellite service supplier in the world.

European firm makes phones for people with impaired hearing

Nokia Mobile Phones, of Finland, says its product line now includes cellular phones that are compatible with HATIS adapters which allow hearing aids to be plugged into telephone handsets.

HATIS is an acronym for hearing aid telephone interconnect system. It fits behind the ear and enables people with 99 percent hearing loss to hear normal voice via wireless phones. The ear piece contains a coil that activates a coil inside the hearing aid, through electronic induction, producing distortion-free sound in the ear. The adapter works with Nokia models 636, 638, 2120, and 2160 cellular phones.

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Radio Electronics Consulting
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AEA's New Software Versions

Whether you are an old hand at radio communications or new to the scene, one company name should be familiar to you: AEA, Advanced Electronic Applications. These people have been in the computer and radio business since the Commodore 64 was just a babe! Their current line of decoders includes the venerable PK-232, PK-900, DSP-1232, and the DSP-2232.

The PK-232 dominated the ham radio market during the 1980's and into the 1990's, and we will use it for our discussions today. It has undergone a number of "firmware" (plug in ROM chips) revisions which have added many new features and modes over the years. These include Pactor and an automatic station position mode which can be connected to a Global Positioning Satellite (GPS) system giving real-time positions of mobile stations. This is also useful for fixed stations, since it gives instant location mapping of the transmitting station. (More on this in a future column.) But AEA has also produced a number of software packages to run their decoders and make logging of stations computerized. (Now there's a term you don't hear much anymore.)

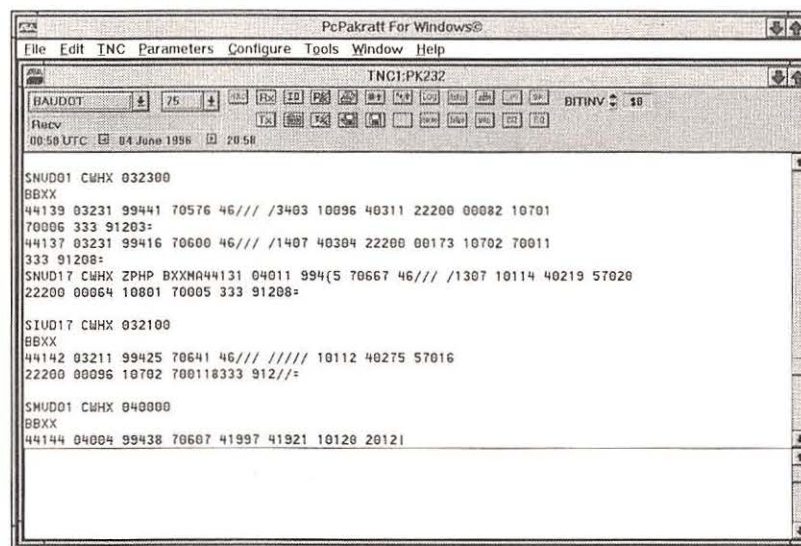
To run all this hardware AEA produced two programs: PC Pakratt for Windows and Log Windows. We looked at the first versions of these programs in this column many months ago and were favorably impressed with the slick packages that had been produced. Pakratt is a point and click decoder program which allows you to take full advantage of the extensive capabilities of the AEA decoders. With all of the PK-232 firmware revisions, keeping track of its command set is a nearly impossible human memory task. This is made much, much easier with Pakratt.

Previous versions of Log Windows were independent receiver control and logging programs. Both programs worked well. In my opinion, if I could only use one program at a time, Pakratt was my choice. Enter the new versions.

■ Now - No Need To Choose

PC Pakratt for Windows, version 2.0, and Log Windows, version 3.0, now work together! Pakratt acts as the "engine" and feeds data to and from Log Windows. What hardware is needed for these new versions? Good question.

FIGURE 1



Comparing the instruction manuals, I found no difference. IBM AT, Windows 3.1, mouse, 4MB RAM, 3MB free disk space, VGA card/monitor and an AEA decoder for Pakratt. Log Windows will work with just about any decoder, not necessarily an AEA. All versions require that the AEA decoder firmware must be dated 1991 or later. We will run them on a Pentium 100 and a PK-232MBX with the latest firmware.

■ What's Pakratt Packed On?

Pakratt comes on one high density disk. Both 5-1/4 and 3-1/2 inch disks are included with each package. Log Windows comes on two, 3-1/2 inch, high density disks. Installation of the program—or in this case, upgrading—is easy and quick: less than five minutes. All Pakratt Windows version 1.0 files that you have previously saved are compatible with version 2.0, a welcome relief. The professionally written and bound manuals are well done and easy to use. However, the Pakratt manual does not have an index, which makes it a bit more cumbersome. The three-page index in Log Windows makes it much more user friendly.

Many of the new features have to do with monitoring two terminal node controller (TNC) ports simultaneously—well, almost. Pakratt can be used with advanced digital signal processing (DSP) TNCs which have

the capabilities of communicating with two different TNCs on different frequency bands: for example, shortwave (HF) and 2 meter packet. Unfortunately, we could not try out these options since the PK-232 does not support these new DSP operating methods. Still, PC Pakratt remains one of the easiest to use programs for the PK-232 series of decoders. See Figure 1.

Although there are a number of new and very nicely implemented features in Pakratt 2.0, to me, the most important new feature is its ability to control and communicate with Log Windows 3.0. Now the two programs work together as one, the way it should be in this age of E-mail communications. Data received in Pakratt can be sent to Log Windows for logging. For hams, data typed into the transmit file of Log Windows is sent to Pakratt for transmission.

Once you have both programs loaded and running under Windows, it is simply a matter of telling each that the other exists. They work perfectly—if you have the right equipment, as I found out.

Log Windows 3.0 is a very different program from its older versions. AEA has adopted the Pakratt screen layout for Log Windows. Pull down menus and lots of color coding makes working with Log Windows a nice experience. It does a lot automatically: for example, linking to a CDROM callsign data

base, keeping track of countries logged, printing out QSL labels, and lots more.

■ Hold Your Horses (and money)

Before you eager monitors run out and buy it, wait one second. It does control radios as claimed. But the number is very limited and it only includes ham transceivers.

Sorry: I was so excited by the prospects and the box that said "ICOM and others" that I thought we could try it on an R-71. No way! A box indicating "data overrun" hit the screen when I tried to set the radio interface. The stand-alone features of each of these programs are very powerful, and the hams among us can utilize them as their writers envisioned. We monitors will just have to wait for AEA to make a monitor version or modification of Log Windows.

I suggest you make lots of noise to AEA while you wait. This might help them formulate a decision. Till then, Log Windows will have to remain a nice, but bland and costly, without-radio-control logging program, not for shortwave monitoring applications.

■ Well?

Both programs are very well presented and represent professional software products. PC Pakratt ranks as one of my favorite TNC controllers for utility monitoring using the PK-232. Log Windows is a fine program for hams, but not useful for general monitoring. Prices vary, so check with your AEA distributor for the best price and latest versions. AEA can be reached at (800) 432-8873 for literature requests, or at CompuServe at 76702,1013 to download files, or on the Web at <http://www.mvangel.com/aea/index~1.htm>. However, to register your opinion on the above topic, you apparently must dial (206) 774-5554 voice or (206) 775-2340

fax, or write P.O. Box 2160, Lynnwood, WA 98036.

■ The Internet Validates a Rumor

Last month we touched on the rumor that a full spectrum, 0.5 to 1300 MHz, PC card receiver was on its way to the market. The cellular 800 MHz band will be blocked as required by the FCC. This information came via the UK radio distributor Lowe.

I'm sure many remember the groundbreaking Softwave product from the now defunct ComFocus. This was the first PC based receiver to hit the market a few years ago. It covered 0.5 to 30 MHz and 108 to 178 MHz, if I remember correctly. Its use of digital signal processing (DSP) circuitry was a tribute to its very knowledgeable and creative designer and was of the highest professional quality. The software configurable bandpass filters are still quite an achievement. From the publicity I have seen on WinRadio it builds on this DSP technology using the latest chips and expanding the frequency range to 1300 MHz.

Now, via the Lowe Web page (<http://www.lowe.co.uk>) we found the manufacturer of this receiver, Rosetta Labs, in Australia. Their product is called WinRadio—not to be confused with the FM broadcast frequency PC radio of the same name which was introduced about 18 months ago. This WinRadio is advertised as a true monitoring receiver with a number of modulation modes; USB, AM, FM wide and FM narrow and a WIDE frequency range. Rosetta's Web page (<http://www.kiss.com.au/winradio/>) allows you to download a screen demo of the radio where you can click on active switches and "tune" the dial. See Figure 2. Of course, it is not functional, but it gave me a good feel for the product.

The projected price of under \$800 is as exciting as the performance claims. With all of this potential I just had to get one! It arrived today, so I cannot give you an opinion on its performance as yet. To be fair to all products, I give them time to grow on me and give my learning curve a chance to get up to speed. So look for a hands-on full discussion of WinRadio in the very near future in this column.

■ Okay, just a quick peek!

WinRadio comes on a medium-sized PC expansion card which is dominated by a large metal rectangular box. The antenna and speaker connections are its only connections to the outside world. The specifications indicate a typical sensitivity of 0.5 uV for the triple-conversion receiver. Tuning is in steps of 1 kHz to 1000 kHz. 1000 memory channels are included and lots more.

How does it all come together? We'll know together very soon. But till next time, remember: don't let your internet phone charges ruin your family's budget. Perspective: use it or lose it. Now how do I hook up this WinRadio card...?

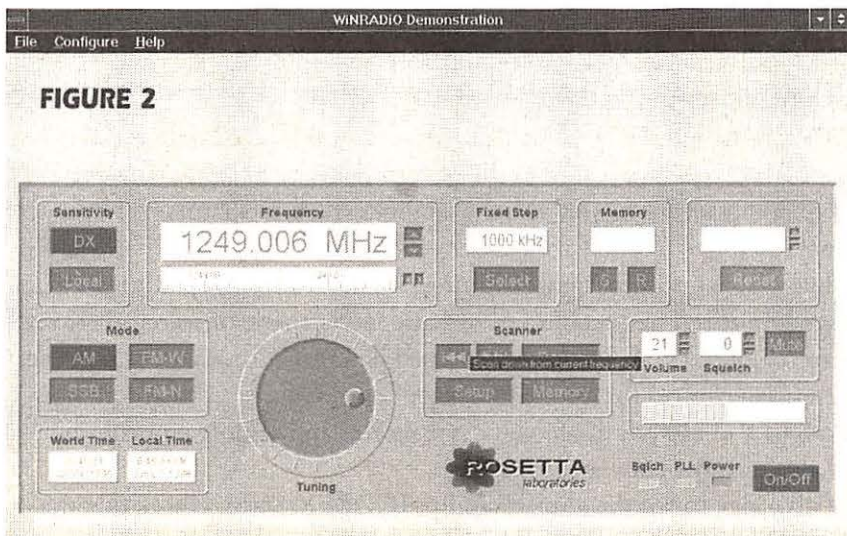


FIGURE 2

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This all-new receiver offers features previously found only on the premium R-9000—which sells to the government for \$7,508—but the R-8500 will retail for under \$2,000. High stability crystal oscillators combine with automatic frequency control circuitry for outstanding stability. Multiple tuning speeds optimize signal hunting. Alphanumeric display aids in identifying memorized frequencies. Automatic memorizing of search-discovered active frequencies, skipping of unwanted channels, three antenna connectors for optimal choices for frequency ranges, even voice scan to ignore noisy channels, and even optional voice synthesizer and remote control—an incredible array of advanced features!

Call today to reserve your premium ICOM R-8500. Check our site on the World Wide Web for updates on specifications and pricing.

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST TO THE RADIO HOBBYIST

by Larry Miller

Guest reviewers: Bob Grove, Gayle Van Horn

Get On The Air

It all started with the **FM-10**, an unstable little novelty transmitter that was advertised as "your own stereo [FM] radio station." It was inexpensive and putting it together was a snap. Unfortunately, it drifted so badly that tuning it in was like trying to hit a moving target, thus making it less of a radio station and more of a, well, novelty. Sold by Ramsey (800-446-2295), it's a mere \$34.95 plus \$14.95 for the optional case.

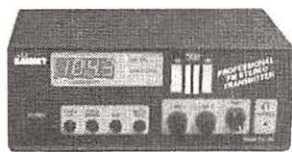
Next came the **FM-25**, another kit but one that took a monster leap in the right direction. The FM-25 was designed for use as a FM radio station transmitter and is actually used in the Caribbean to cover an entire island. It, too, is easy to assemble and this one works great. Frequencies are set by dip switches. It's rock solid stable — no frequency drift here — and there's a little modification that you can make that pushes the power a wee bit over the FCC's limits for those folk in the Caribbean, you know.

DX Radio Supply (610-273-7823) sells the FM-25 at a 15% discount, for \$110.46 plus \$6.00 UPS, and it comes with case, antenna, and even a wall power adapter.

Clearly, there is a great deal of interest in these micro-power FM broadcast band transmitters. In fact, a recent newspaper story estimated the number of illegal micropower stations on the air in the U.S. at over 10,000 — a fact not lost on the folk at Ramsey who have just introduced yet another in their line of "personal radio broadcasters."

The **FM-100** is specially designed for the micro-power broadcasting market. It features up-down tuning of frequency, low-pass filtering for great sound and peak limiters for maximum audio punch.

The FM-100 is a kit and it



rings in at \$249.95. But wait, there's more. You can also buy — if you include a written statement promising that the unit will be exported — a "special high power" version of the FM-100 kit called the FM-100EX. It costs \$329.95, but the power of the unit is not revealed. You can also buy a fully assembled version of the FM-100EX that's already assembled for \$399.95. A statement promising to immediately export the unit is also required.

For more information on the entire line of Ramsey kits, contact the company at 716-924-4560.

It's apparent that the world has chosen to thumb its nose at the FCC when it comes to micropower broadcasting. With the number of transmitters on the air, can anyone realistically expect the genie to be put back in the bottle?

Protect-O-Drake

If you bought one of those new Drake SW8 shortwave receivers, you know that they're a pretty fine receiver. The fact that it's a portable makes it just right for taking along on trips, but the very thought of putting a \$700 radio in an overhead compartment makes one cringe. That's why the folks at Drake have come up with a carrying case for the SW8.

Made of rugged woven nylon,



it enables users to tote their SW8 wherever they go and do so with reduced fear of dents and dings. The carrying case has an adjustable strap for comfortable carrying and closes with a velcro flap.

The SW8 carrying case is yours for just \$49.00 and you can get it from your favorite authorized Drake dealer or by calling Drake directly at 1-800-9DRAKE4. You can also contact Drake by postal service at P.O. Box 3006, Miamisburg, Ohio 45343, or on the internet at <http://www.rldrake.com>.

Incidentally, Drake has announced some changes in the SW8. An improved selectable sideband synchronous detector greatly reduces the severe audio distortion that can occur due to signal fading. The detector permits selectable tuning of either the upper or lower sideband portion of an AM signal.

"The synchronous sideband detector improves signal quality immensely," says Rich Renken, national sales manager for Drake. "The improvement is markedly noticeable when listening to the SW8."

Premium Filter Module

Kiwa Electronics has released a new premium filter module for radios with an IF of 455 kHz. It provides improved performance compared to the standard filter module found in most receivers.

Kiwa's premium filter module is the ideal replacement for Lowe receivers and the new AOR AR7030 receiver. The shape factor is typically 1.65, but the most impressive specification is the ultimate rejection, which typically exceeds 100 dB. For those of you unfamiliar with these numbers, most fil-

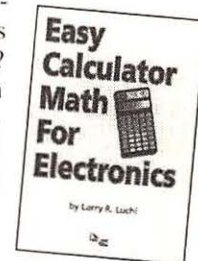
ters exhibit 65-85 dB of ultimate rejection.

The new premium filter module allows the serious radio enthusiast the opportunity to obtain performance similar to the best Collins filters without the high price and with more selection of available bandwidths.

For more information, contact Craig Siegenthaler at 509-453-5492 or order toll-free at 800-398-1146. Visit Kiwa's web site at <http://www.wolfe.net/~kiwa>.

Math for Electronics

For the first time since no-code was introduced, applications for the higher levels of hamming have stopped growing. Could it be that younger people just aren't that interested? Or is it the math? Even with the anyone-can-do-it multiple choice tests, there is still lots of math.



In his new book, *Easy Calculator Math for Electronics*, Larry Luchi teaches you how to make quick work of all those nasty numbers. You'll learn each step for over 30 electronic formulas from Ohm's Law to phase angles to component values for resonance to transistor characteristics. Each one is carefully explained with one or more step-by-step examples presented in an easy-view, easy-to-follow format. Terminology and theory explanations are also included, along with diagrams to aid in understanding the material.

Luchi's new book probably won't turn the ham radio hobby around but it should help make the journey up through the classes less intimidating. *Easy Calculator Math for Electronics* is \$17.95 from LimeLight Books, P.O. Box 493, Lake Geneva, WI 53147 or call 414-248-4845.

CyberHam

CyberHam magazine is a new (or proposed) magazine that its publishers say will "put together what the ham radio of today needs — how ham radio and computers connect."

"Some articles are be [sic] just amateur radio related and some just computer oriented, but the majority will tie the two hobbies together." Topics are to include ham radio on the internet, packet radio and APRS, reviews of various software programs, computer programming, SSTV and ATV, RTTY, AMTOR, satellite communications and a YL (young ladies) column on computer/ham radio entitled, "Not for Males only!"

You may want to check out this new magazine: single issues of CyberHam are \$3.95 from Harlan Technologies, 5931 Alma Drive, Rockford, Illinois 61108. We're not sure of the magazine's publishing status, since we only received an

advertising rate card that also looked for authors, but it sounds like it plans to move in the direction of ham radio's future. Mention "CyberMT" when you write!

Obits

In the cycle of births and deaths we have some sad news in other areas of our hobby. RCMA, the venerable old scanning club, has announced that it is ceasing publication. According to club officials, membership declined to the point where the club was unable to publish another issue.

Many of the hobby's "big names" got their start in the Radio Communications Monitoring Club of America, and the club will be greatly missed. We especially salute the many volunteers that made RCMA possible for so many years.

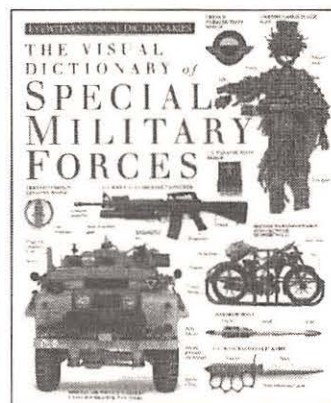
CB Magazine, published by CQ Communications (which also

publishes *Popular Communications*), has also ceased publication after a six-month run. The last issue will be August. The former editor of CB, Harold Ort, now becomes the editor of *Popular Communications*, replacing Chuck Gysi.

Says Ort, "I look forward to 'fine tuning' the magazine and revitalizing it and our radio hobby across the board."

Special Military Forces

When specially trained forces are dropped behind enemy lines, their success—and their survival—are dependent upon their resourcefulness and their equipment. History will reflect upon their resourcefulness, but we can now see their equipment, thanks to *The Visual Dictionary of Special Military Forces*. This unique



volume is a colorful collection of more than 200 photographs and graphic illustrations of American OSS, British SOE, and other insurgent forces worldwide since the beginning of World War II.

Pencil bombs, disguise kits, rectal tool cannisters, exotic weapons, covert communications, code machines, camouflage, survival kits, sabotage instruments, spy cameras,

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- POL-ARO 100 Baud
- Duplex ARO
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- TDM342/ARO-M2/4
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- FEC-S • FEC1000 Simplex
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- All modes in typical baud rates with possibility of changing to any desired value of speed and shift.
- All options are available from the main menu, saving or loading to and from hard/floppy drive in bit form, means no loss of unknown signals!

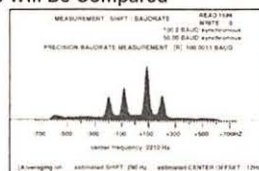
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lockpicks, even special vehicles, aircraft and vessels; they're all here in this unusual collection, along with historical insights.

The Visual Dictionary is \$16.95 plus shipping from Grove Enterprises (800-438-8155); it's also available from the publisher, Houghton Mifflin Company.

— BG

Monitoring the Feds

Listening in on federal government communications is a popular sport among shortwave and scanner listeners alike. Since the *Grove Federal Frequency Directory* first published such a list in the early 1980s, a host of other publications have appeared on the market.

Monitoring the Feds by John C. McColman is the latest work, and it presents quite a mix. The good news is that the table of VHF/UHF federal frequency al-

locations is quite good, with very few omissions. There is a reasonably recent (though not up-to-date) listing of NOAA weather broadcasters by state; the anecdotal chapters provide tips on hunting frequencies and recognizing users; and a by-frequency table will allow beginners to identify the more-commonly-used frequencies.

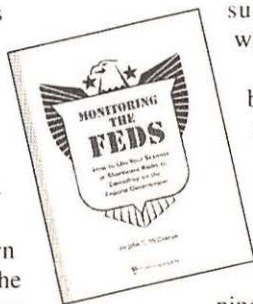
But there is a downside in addition to the usual misspellings: some frequencies are misidentified as to user; the Bureau of Immigration and Naturalization is listed separately from the Border Patrol even though they are the same agency (even the frequencies shown are the same!); massive spectrum users like NASA and FEMA are only given a half dozen or so frequen-

cies each, while the Army, Navy, and Air Force are omitted entirely; although the book's cover recommends the work for shortwave listeners, there are so few shortwave listings that such an application would be futile.

The utility of this book is puzzling; I'm not sure just where it fits in. Several books currently on the market are infinitely superior in content. Perhaps the scanning novice would find this book a good start before he moves on to more productive listening.

Monitoring the Feds is \$17.95 plus \$3 shipping from Tiare Publications, PO Box 493, Lake Geneva, WI 53147; ph. 414-248-4845.

— BG



SW Program Guide

The *Worldwide Shortwave Listening Guide*, successor to John Figliozzi's original loose-leaf *Shortwave Radio Guide*, is newly available from Radio Shack.

This latest edition begins with a basic introduction and brief primer to the hobby for beginners and follows with a station ID List. John's *Program List* contains nearly 7,000 individual program listings to hear on shortwave radio—certainly enough to keep you glued to your receiver. The by-hour listings include program names and descriptions, target areas, and frequencies. Although the frequencies are included, many will change as new schedules are released, and I would recommend you follow *MT*'s English Language Shortwave Guide, club bulletins, or newsletters for up-to-date frequencies.

If you are a program listener or

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- Log found frequencies to files while scanning.
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- Link up to 15 frequency disk files.
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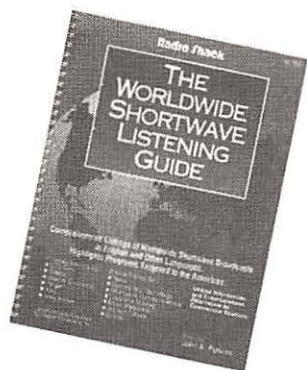
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a beginner to this fascinating hobby, John Figlio's *The Worldwide Shortwave Listening Guide* could be just the book to complement your listening ses-

sions. It's available from your local Radio Shack for \$9.95, or you may order direct from the author at JFiglio@aol.com, or 45 Algonquin Road, Clifton Park, NY 12065-7703.

—GVH

Voice Heard 'Round The World

Most Americans don't know her name but in some parts of the world, her voice was more recognizable than Ronald Reagan's. Philomena Jurey was heard by over 100 million people around

the world during her 28-year career with the Voice of America.

Jurey documents her life at the VOA in a new book called, *A Basement Seat to History*.

Jurey first moved to Washington, DC, in 1958, working at the Washington bureau of London's *Daily Telegraph*. "I made tea," says Jurey. Three years later, anxious to get into hard news, she applied at the VOA. By 1971, she was one of only two women to be accredited as State Department correspondents. In April of 1974, she was appointed as White House correspondent, a position she held for 14 years. She retired in 1989.

Since that time she's been working on the book, eventually publishing it herself when she was told that a book about the VOA wouldn't sell.

You can get a copy of the book by sending \$16.95 plus \$2.50 s/h to Mrs. Jurey at P.O. Box 5446, Washington, DC 20016-5446 or fax 301-654-5508 with your credit card number. Please mention *Monitoring Times*.

New New England

The second edition of the *Official New England Frequency Guide* is now available. Contain-



The GAP Antenna Products "Titan DX"

By Bob Grove

Just about everyone dreams of a high performance HF antenna for shortwave listening or ham radio that takes up a minimum of space. Low cost, ease of installation, and inconspicuous construction are also prized characteristics on the wish list. With these thoughts in mind, I ordered the "Titan DX," a 3.5-30 MHz vertical with no radials, grounds, or guy wires. Sound too good to be true? Let's take a look.

Aptly named, the fully assembled Titan is 25 feet in length and weighs a hefty 25 pounds. It can be mounted on a 1-1/4" O.D. pipe, chimney, tower, or roof.

Designed for wideband performance on 75, 40, 30, 20, 17, 15, 12, and 10 meters, with an SWR under 2:1 and a power rating of 1500 watts, the Titan uses no lossy loading coils and utilizes an elevated center feedpoint, so ground losses are minimal compared with competitive bottom-fed verticals, even with the antenna mounted close to the earth.

■ Inside the packing box: good news and bad news

The GAP Titan DX arrives in an oversized box and consists of a semi-kit of aluminum pipes, PVC insulators, associated hardware, and even a nut driver which fits nearly all of the screw heads. A step-by-step assembly manual is included (and even a ball-point pen for checking off the steps as they are completed—nice touch). All hardware is pre-drilled with good alignment tolerances, but the heavy-gauge, seamless aluminum usually required an end wrench or socket set to start the tap before the nut driver could be used comfortably.

The assembly experience had its ups and downs; I wouldn't recommend this product to the mechanically inept, or to individuals who lack strength and stamina. But my frustration was mixed with admiration for the quality of materials. It is easy to criticize the work of others; this critique is intended to be

constructive, to make a good product even better, and to assist the builder to avoid the problems I encountered.

I have always maintained that engineers should never be allowed to write instructions. The GAP assembly procedure is a case in point! I'm an experienced kit and antenna builder, but it took me more than four hours to assemble my Titan DX, largely due to wasted time caused by omitted and out-of-order steps.

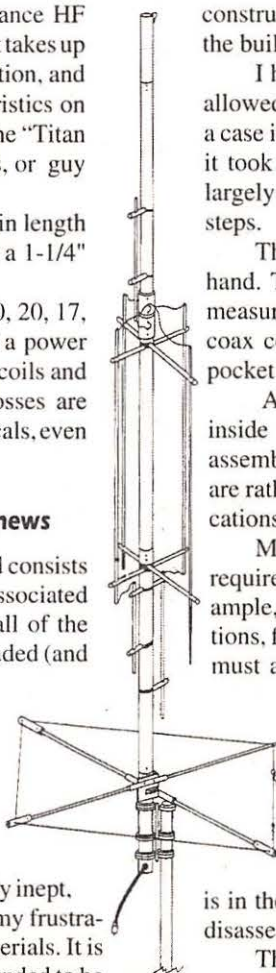
The builder would be well advised to have a tool kit on hand. To assist with the hardware you will need pliers, tape measure, and end wrenches or a socket set. Installing the PL-259 coax connector will additionally require wire cutters, pliers, pocket knife, tape measure, solder, and soldering iron.

Also unmentioned is the fact that many parts are packed inside the tubing for shipment and must be removed before assembly. I discovered that the hard way, since the illustrations are rather crude and not drawn to scale, making some identifications difficult.

Most exasperating of all is that some out-of-sequence steps required disassembly of previous steps to continue. For example, the manual takes you through assembly of mast sections, followed by feeding the coax down through them (which must actually be done first, since you must thread the coax through the smaller sections).

There were other inconsistencies which should have been caught and corrected: "Locate the...section with 2 screws attached" (there were no screws); "...factory has placed a screw..." (Still no screw, just holes and rivets); "Slide [the assembled mount] over the base of the antenna" (It can't be done; the coax cable is in the way, so a previously assembled subsystem had to be disassembled, then reassembled).

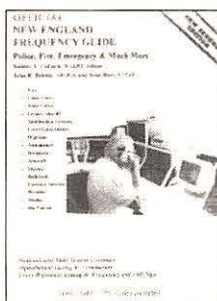
The instructions say that an open area is required for assembly, but fail to mention that it will be necessary to lift and



ing over 20,000 public safety frequencies for Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont, it's really six books in one.

Edited by Bob Coburn with co-editors John Bolduc and Scott Rice, the book sports a new 8-1/2" x 11" size, organized into three sections.

Part one includes basic information and frequency assignments, including the new proposed low-power frequencies and



more.

The team is at full readiness on this edition, starring former career firefighter Keith Victor in Connecticut, Bill Dunn in Massachusetts, John Bolduc, Paul Bolieau, and Scott Rice in New

the new 800 MHz national plan for public safety agencies.

Part two is organized on a state-by-state basis, each with maps plus a by-community listing of frequencies that includes city, service, license, call sign, PL, and

Hampshire, 25-year public safety veteran Elmer Stanley and Denis Dandeneau in Rhode Island, former NESN writer Jim Lawrence in Vermont, and D. Loren Fields in Maine.

The third section of the book is a complete by-frequency listing of all New England public safety agencies.

Priced at \$24.95 postpaid, this is an excellent book for anyone scanning the bands in New England. You can order your *Guide* at 800-351-7226 or by writing to Box 525, Londonderry, New Hampshire 03053. Mention *MT* when you call.

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MT REVIEW

support the mast at each end during assembly to accommodate the various elements which stick out about a foot in all four directions.

The coax cable is of the highest quality, as is the U.S. made PL-259 connector, but they aren't attached, so the builder should be an experienced solderer as well; no instructions are given—just a reference to the *ARRL Handbook* for assistance. It would have been nice if an inexpensive double-female barrel connector had been included, since all coax lines are terminated in male connectors, but the GAP user will have to provide his own. And no advice was provided to weather-seal that union.

■ So does it work?

After erecting the antenna on the specified mastpipe, it was time to see if the effort was worth it. Using a Kenwood TS440S transceiver and an MFJ tuner with a cross-needle SWR meter, I went to work. All bands were well within the specified 2:1, but 40 meters showed resonance too low in frequency, and ten meters a little high. Since the manual contains no advice on how to tune the antenna, I had to call the factory. It turned out that both adjustments could be made with the bottom hoop wires; easy enough. After some pruning and measuring, all bands were in resonance; I was ready to put the antenna on the air.

It was approximately noon, so 75 and 40 meters were lousy. Nonetheless, I had no problem working stations in Birmingham on 75 meters (150 miles) or Houston on 40 (1200 miles). Colorado came right back on 20 (2000 miles), so I was feeling pretty frisky.

I'd never worked 17 meters before, so I tuned up on a DX contest pileup—and immediately snagged the quarry: Paraguay—and got a 5-9 report! Not bad. Next was a surprise: The Titan works beautifully on 27 MHz CB; a distant, weak station complained that I was blowing his speaker off his table!

One might be tempted to use the Titan on VHF or UHF as well, but I would advise against it if you have any kind of option. Yes, it does hear signals and, yes, it will radiate on some of the

harmonically-related VHF/UHF bands. But because of its physical length, the radiation pattern ("takeoff" angle) is very high, reducing its effectiveness on these higher frequencies. Nonetheless, if only one antenna is allowed, the Titan can be used for local VHF/UHF applications. Just don't expect much.

■ Vertical or horizontal?

An on-going debate among communicators argues the relative advantages of vertical or horizontal polarization. The most common indictment against the vertical is that it is inherently vulnerable to electrical interference because the noise radiated by house wiring is vertically polarized. Apparently that's not true in my home; I've never heard a quieter antenna than my new GAP Titan. Background noise was well below S-1, barely audible until a signal comes booming in, disrupting the quiet.

■ The bottom line:

Until now, the majority of "all-band" HF verticals required lossy traps, long radials, massive counterpoise structures, and other ungainly and unsightly contrivances. The GAP design is a true vertical dipole cluster using efficient conductors, stainless steel hardware, heavy gauge aluminum, and strong insulators to assure dependability, long life, and high performance.

Antennas are not magic; they behave according to well understood physical and electrical laws. Even so, some antenna innovations continue to amaze me; the GAP is one of them. I have been assured by the manufacturer that my assembly complaints have been corrected in the new assembly manuals, making the job easier and faster. The GAP is a strong contender in the amateur antenna market and I'm convinced it's here to stay. I know mine is.

(Titan DX vertical antenna, \$289 from GAP Antenna Products, 6010 N. Old Dixie Highway, Vero Beach, FL 32967; ph. 407-778-3728)

Table 1

2:1 SWR BAND EDGES

75 M	3830-3950 kHz
40 M	7040-7300 kHz
30 M	9870-10135 kHz
20 M	12850-14880 kHz
17 M	17960-18480 kHz
15 M	21200-22500 kHz
12 M	24300-25360 kHz
10/11M	27000-30000+ kHz

(NOTE: Band edges can be adjusted)

Drake SW1 — a Beginner's Tabletop

When eyes first light upon the Drake SW1, the brain flashes up a weird message, "This is what a young Drake R8 looks like. When they grow up, they get bigger and have more knobs."

And it's true—the family resemblance is unmistakable. The SW1 has the same matte black color scheme, basic layout, soft rubber pushbuttons and overall appearance of its worthy older brother.

The SW1 measures 10-7/8 inches wide, 4-3/8 inches high (including soft rubber feet) and 7-5/8 inches deep, including front knobs and rear panel connectors. In all, it's just a little bit bigger than a large scanner. The left side of the front panel is dominated by a three-inch front firing speaker. (Hooray, no top-firing speaker!) To the right of the speaker are two knobs—one for volume, the other for RF gain. That RF gain control is really the only nonessential item on the receiver.

The upper right quadrant of the front panel houses a bright, highly legible green LCD that has just two functions: to display the frequency in numerals that are close to 3/4" high, and to display a pair of LCD dots that indicate when the memory mode has been activated and power has been supplied to the receiver. In terms of readability, this display is simply outstanding and a welcome sight for "over 40" eyes.

Below the display is a 16-button keypad, featuring numerals in the standard three-over-three-over-zero telephone-style configuration. On either side of the zero are CLEAR and ENTER buttons. The right-hand column of the keypad is devoted to ancillary functions: memory recall, memory store, display brightness, and power on/off. Move to the right again, and there are the various tuning controls: a pair of buttons that slew the frequency up or down in 5 kHz increments, as well as a regular tuning knob, replete with "speed" dimple, that changes the frequency in 1 kHz steps.

That's it for the front panel—just 3 knobs and 18 pushbuttons. On the left side of the cabinet is a 1/8" socket that accepts stereo or monaural headphones (reception is monaural only). On the back of the receiver is an SO-239 connector for coaxial cables and a pair of clips for wire antennas. Finally, there is a



socket for the external transformer that supplies power to the receiver. So far, so good.

Another plus is that, inherent in the design and construction ethos of the SW1, is Drake's reputation for superior construction, quality control, and service. Drake is legendary for building high-grade gear, and especially for giving top-notch service even years after a model has been discontinued. If you're looking to keep a receiver for the long haul, the SW1 has a significant advantage over plastic portables, whose manufacturers almost invariably provide mediocre repairs, or treat them as disposable items.

■ What It Doesn't Have

The SW1 offers frequency coverage from 100 to 30,000 kHz and 32 memory presets. Not bad. But one can almost imagine a hypothetical conversation between the marketing manager and the chief engineer discussing how to produce a quality receiver at an entry level price by leaving out everything the entry level listener doesn't need. Result: one of the things that makes the SW1 remarkable is all the things it *doesn't* have.

To begin with the SW1 offers only one mode: AM. There is no BFO; therefore, reception of single sideband or CW signals is impossible. In addition, there is no fade-busting synchronous detection mode. There is only one bandwidth: nominally 5.5 kHz at -6 dB, and 12 kHz at -60 dB. There is no signal strength meter, either, and no tone control.

And, with this kind of bare-bones approach, there are none of the more exotic controls that those who hunt faint signals have come to know and love: no notch filter, no passband offset, no preamplifier, no attenuator, no noise blanker circuits. There are also no flip-down feet or wire bail to elevate the front of the receiver when it is sitting on a desktop.

The only option is a plastic carrying handle,

which is curious, as the SW1 is clearly not a portable. There is no whip antenna—nor is it offered as an option—and there is no preamp to boost signal strength on a whip if one were attached. It makes one wonder why a carrying handle would be desirable, since this radio *must* be attached to a listener-supplied external antenna. Clearly, this is a folks-tabletop, not a portable.

■ How the SW1 Handles

Frequency entry is straightforward: if you want the BBC World Service on 6175, press 6, 1, 7, 5, and ENTER. Bingo! You're there.

The only wrinkle is that if you hesitate more than about 3 seconds, the receiver will execute whatever is on the display. So, if you press 6, 1, 7, and then stop to scratch your nose, the SW1 will take it upon itself to tune the circuits to 617 kHz in the AM band. In short, he who hesitates find himself on an unwanted frequency. On the other hand, if you manage to punch in 6, 1, 7, 5 really fast and then don't feel like pressing the enter button, just hang out for a moment, and the receiver will do it for you.

Memory operations are similarly uncomplicated. To store a frequency in memory, tune to the desired station frequency, press MEM STORE, select a memory channel (00 through 31), then press ENTER. Or, don't press ENTER, and after a short delay the SW1 will automatically store the frequency in the designated memory.

To recall a memory, press MEM RCL, enter the number of the memory channel you want, and press ENTER. If you do not press ENTER, the receiver will automatically recall the memory after a short delay. Once in memory mode, a small LCD dot lights on the display, and you can use the UP and DOWN slewing buttons to step through the memory channels, starting with the last recalled memory channel.

The only rub in all this is that at no time does the SW1 tell you what memory channel you are accessing. So, if you meant to recall memory channel 22, but you pressed 23 by mistake, you have no way of knowing it.

■ How the SW1 Performs

Sensitivity is quite good and, unlike plastic

portables, the SW1 has dynamic range that is well-suited to connecting this receiver to high-performance antennas, such as the Eavesdropper and the Alpha-Delta DX Ultra, without overloading. The audio from the front-firing speaker sounds pleasant, indeed.

So, at first blush, the SW1 seems well-suited to the intended task: an inexpensive tabletop receiver designed for the person who simply wants to listen to the offerings of international broadcasters.

Unfortunately, there are several flies in the ointment. First, while the single bandwidth offers nice-fidelity reception with stations "in the clear," the bandwidth is simply too wide, and the skirt slopes not steep enough, for listening to stations at typical international-broadcast spacing. The result is that if there is stronger station broadcasting only 5 kHz away from a station you want to hear, your ears are treated to a howling heterodyne.

Since the SW1 offers no second bandwidth or selectable-sideband reception, there is no possibility of escaping from the din of heterodynes caused by adjacent stations, except through the use of an external notch filter or some other post-processor.

Second, the SW1, which tunes and displays in 1 kHz increments, chugs badly when tuning by knob. So, if you want to tune by knob, every time the receiver advances 1 kHz, you hear a "pop" through the speaker or headphones. Tune fast, and all you hear is a series of pops, leaving you clueless as to what otherwise would be audible in the background. The only alternative is to tune V-E-R-Y—S-L-O-W-L-Y. For the dedicated bandcruiser, this is a pain in the cheeks.

Finally, the SW1 offers no synchronous detection, a feature that is readily available on portable receivers in the \$200-\$500 range. Synchronous detection helps to tame the fading that occurs in world band signals by replacing the broadcast carrier with a locally generated carrier. The end result is that the received signal distorts less, and the listening experience is considerably more pleasant.

On receivers that offer sideband-selectable synchronous detection, there is the added bonus that the listener can select one sideband over another as a means of escaping from adjacent-channel interference—another technique that helps to make listening nicer. But alas, this is simply unavailable on the SW1.

■ The Bottom Line

The SW1 is based on a worthy concept: an inexpensive tabletop that offers few features, but superior performance with that which is offered. In some regards, Drake seems to have hit the mark in performance, but has missed in other areas. This would be a better offering

had Drake (a) solved the problem of adjacent channel heterodynes, (b) done something about the chugging when tuning by knob, and (d) addressed the issue of the missing synchronous detection, which is available on much-cheaper portables.

That having been said, the Drake SW1 is a superior offering for the price for those who want something straightforward, affordable and uncomplicated—yet, with the quality of construction and service generally reserved for pricey tabletop models.

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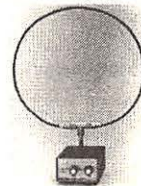
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Tape recording transmissions is the most effective technique you can use to identify voice signals you hear on your scanner. A scanner connected to a carrier or voice activated tape recorder works tirelessly, hour after hour, trapping signals while you are away at work or asleep in bed. The ideal setup records the action and ignores the time in between.

This month, we discuss two common methods of tape recorder control: carrier activated and sound activated, and I review the BMI NiteLogger II, a commercial tape recorder controller.

■ Carrier Activated Recording

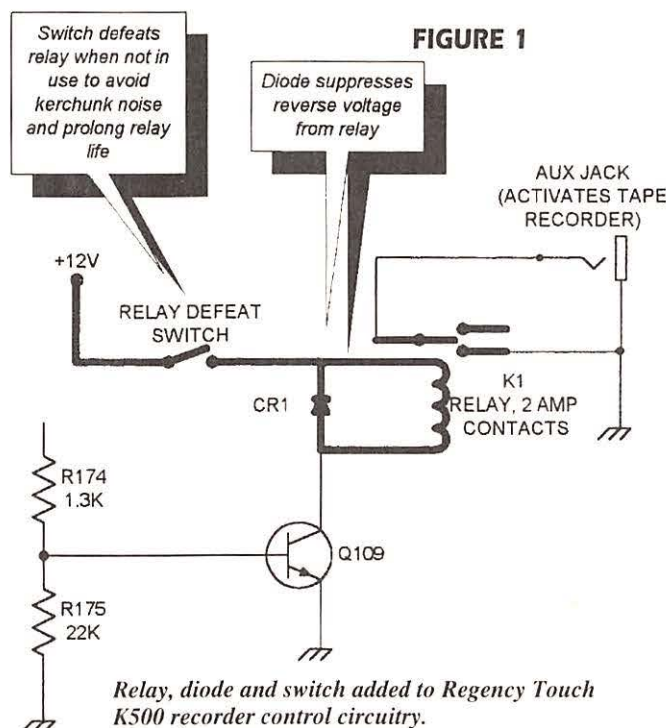
A carrier activated system detects when the scanner receives a signal. Better scanners provide a recorder control terminal which is pulled to ground when a radio signal is detected. They are designed to be used with a tape recorder equipped with a remote control jack.

The 1980 Regency Touch K500 and the old Electra/Bearcat BC250 and BC300 use a transistor to trigger a recorder when an FM carrier is detected. The current Uniden/Bearcat BC9000XLT uses a relay instead.

The surge current required to start a tape recorder motor can be too much for a transistor switch to bear. My K500 used a simple NPN transistor which wasn't up to the task. I've had to replace the National 92PU45A Darlington recorder control transistors in a handful of BC250s and BC300s, too. Therefore, I prefer to add a good quality electro-mechanical relay which, in turn, controls the recorder (Figure 1).

Even if your scanner lacks a recorder control circuit, you can build one inside your scanner if you have a schematic diagram and enjoy electronics tinkering. It's a relatively simple job, usually requiring one transistor, a diode, a resistor, a relay, and jack.

Look for the logic level signal used to trigger the squelch gate. Feed that signal into the base of a transistor, and use the transistor to activate the relay. Add a diode across the relay coil to protect the transistor from reverse voltage spikes produced across the relay coil. The exact configuration will vary depending on whether the carrier present signal is active low or high. Be sure to use a relay with



Relay, diode and switch added to Regency Touch K500 recorder control circuitry.

contacts which can handle at least 2 amps.

The carrier activated recording scheme has a lot going for it. The recorder traps a soft spoken dispatcher just as reliably as a fully modulated loud mouth. A minor disadvantage is that dead carriers will be recorded, too.

■ Sound Activated Recording

A sound activated system detects a voice or noise emitted by the scanner to start the recording. Voice activated recorders, more accurately described as sound activated, can be connected to virtually any scanner without modification.

I use two older Radio Shack CTR-75 VOX recorders, modified to shorten the post detection delay. The main disadvantage of sound activated recording is that it often fails to record the first word while the detection gets under way and the tape is getting up to speed. Perhaps a sharp experimenter will publish a circuit using the newer "bucket brigade" ICs to delay the audio while the recorder motor reaches full speed.

■ Coupling the Audio to Your Recorder

So far, I haven't mentioned how to connect your scanner's audio output to your recorder's

audio input. The best scheme uses a low level tape out connection which isn't affected by the volume control setting, as found in the RadioShack PRO-2006 and ICOM7100A. The specifics of matching the output level of your scanner to the input level of your recorder varies with your equipment. Doug DeMaw covered the topic in his excellent January 1995 *MT* column.

■ BMI NiteLogger II

What if your scanner lacks a recorder control and your favorite tape recorder lacks voice activation circuitry? You could modify both your

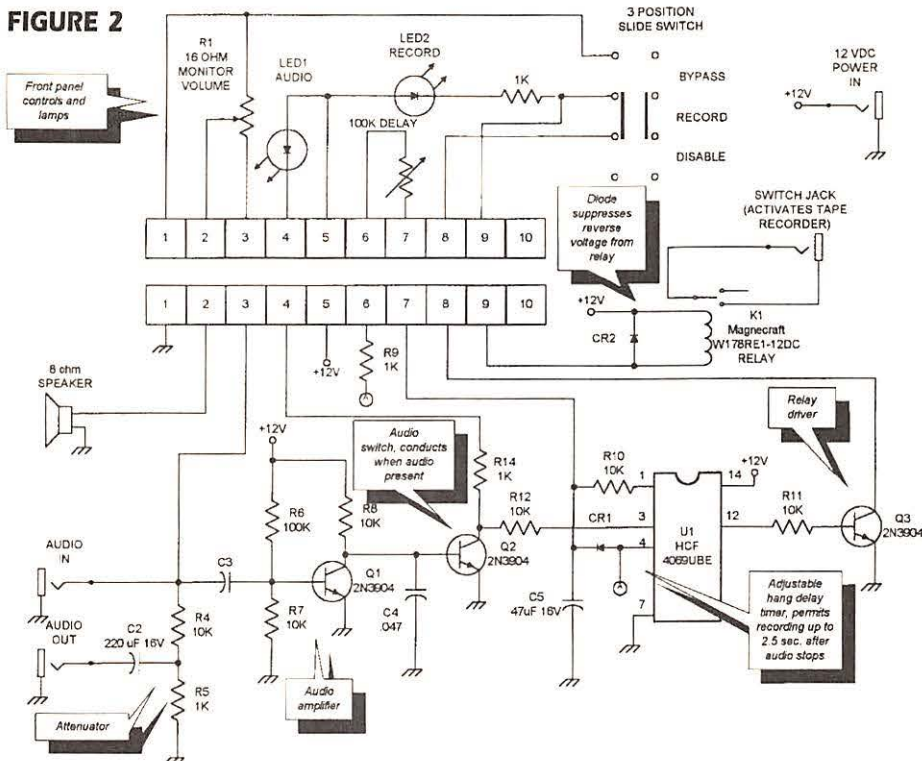
scanner and recorder, or simply use a NiteLogger II instead. The NiteLogger II is a well designed recorder activator, assembled in the USA by Benjamin Michael Industries, Inc., of Caledonia, WI. Street price is about \$70.

The NiteLogger solves all the issues of coupling the audio from scanner to recorder, as it simply plugs into the external speaker jack of your scanner. It works when connected to the earphone jack of a Uniden BC3000XLT portable, too, but the scanner's volume control must be set higher. The NiteLogger II contains a small speaker so you can hear the radio traffic. An internal volume control allows you to tape silently, save for the clicking of the NiteLogger's relay.

One red LED flickers with the scanner's audio, while another LED shows whether the control relay is closed or open. A three position slide switch allows you to control your recorder manually or via sound activation.



FIGURE 2



Reverse engineered schematic of NiteLogger II

The switch in our NiteLogger is a bit fussy, requiring care when moving it exactly into the detent. A rheostat adjusts the tape hang delay between .25 and 2.5 seconds.

The NiteLogger's relay has silver-nickel contacts, rated at 2 amps, 30 VDC maximum. BMI claims the relay will last for a minimum of 200,000 operations when switching a device, or 10 million operations when no current is switched. It closes with a "kerchunk" sound which will keep you awake at night.

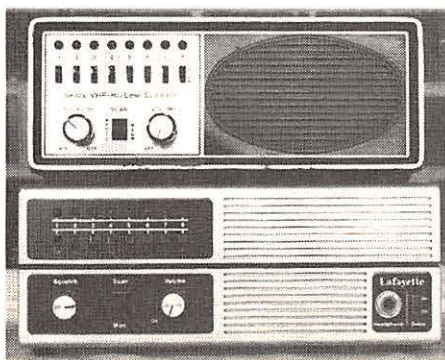
The NiteLogger II is powered from a 12 VDC source. Oddly, the included wall wart

power supply is marked 9 VDC, but ours furnishes 14.3 VDC no load.

A one page instruction sheet is provided and I commend BMI for publishing meaningful product specifications. No schematic is provided, so I opened the NiteLogger II, studied its circuitry, and drew my own schematic (Figure 2). The construction is clean, with components neatly laid out and clearly marked on two printed circuit boards.

I'm impressed with the NiteLogger II. For more information, call BMI at (414) 835-4299.

COLLECTOR'S CORNER



This month's entries for the Collector's Corner are 1976 vintage 8-channel crystal controlled scanners manufactured by Electra for Sears and Lafayette Radio Electronics. Photo by Pam Parness, N9HRZ.

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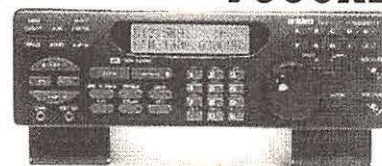
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EME Communications: "Moonbounce"

This month we take a look at antenna requirements for "moon bounce" (earth-moon-earth or EME) communications. Military and amateur stations use EME to communicate via Morse code, voice, and digital modes. For this, one must employ an antenna which can focus signals into a highly directional beam, and accurately aim that beam at the moon.

About one quarter of one percent of that signal actually reaches the moon. Then about 6 percent of this one quarter percent is reflected back in the direction of the earth. As you can see, a very, very small portion of the original signal sent towards the moon is actually returned to earth. And, of course, your antenna can't possibly capture more than a very small fraction of that returning energy. Obviously, returning EME signals are extremely weak!

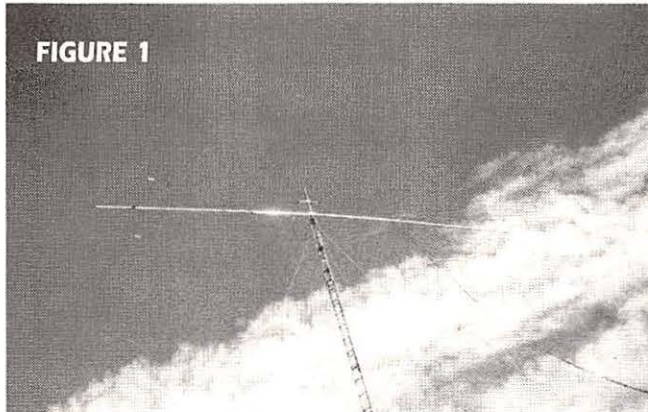
Another way of expressing the problems to be overcome by EME antennas, transmitters and receivers is to point out that path losses in EME work average somewhere between a whopping big 250 and 300 dB. No wonder moonbounce is one of the activities referred to as "weak signal work"!

To get an insider's view of EME antenna requirements I recently visited the station of Francis (Shep) Shephard, W7HAH. Shep is a long-time ham with many honors to his credit, including ranking number eight in the world in a recent EME contest. Drawing on his considerable experience in ham radio he says: "The antenna is the most important component in any communication system, especially in weak signal work."

■ Antennas for EME Work:

It is actually possible to do EME work with a single-boom, long Yagi-Uda beam. Conditions must be right, and high power is required, but it can be done. But for something approaching reliable operation and depending on the band utilized, gains of something like 20 to 30 dBd are considered minimum for reliable operation. When you consider that our Yagi-Uda beams for HF work typically give us something like 6 to 12 dBd

FIGURE 1



W7HAH's six-meter, long-boom Yagi-Uda antenna.

gain, you can see that antenna requirements for EME work are demanding indeed.

On VHF, and even on UHF, the very high gains needed in EME work are usually attained with large arrays consisting of many long-boom, multi-element Yagi-Udas (figs. 1, 2, & 3). These antenna arrays sometimes contain 40 or more long boom Yagi-Uda beams connected by low-loss feeders. These arrays often reach the size of a large bedroom! On UHF, and particularly on microwave, dish antennas are also used.

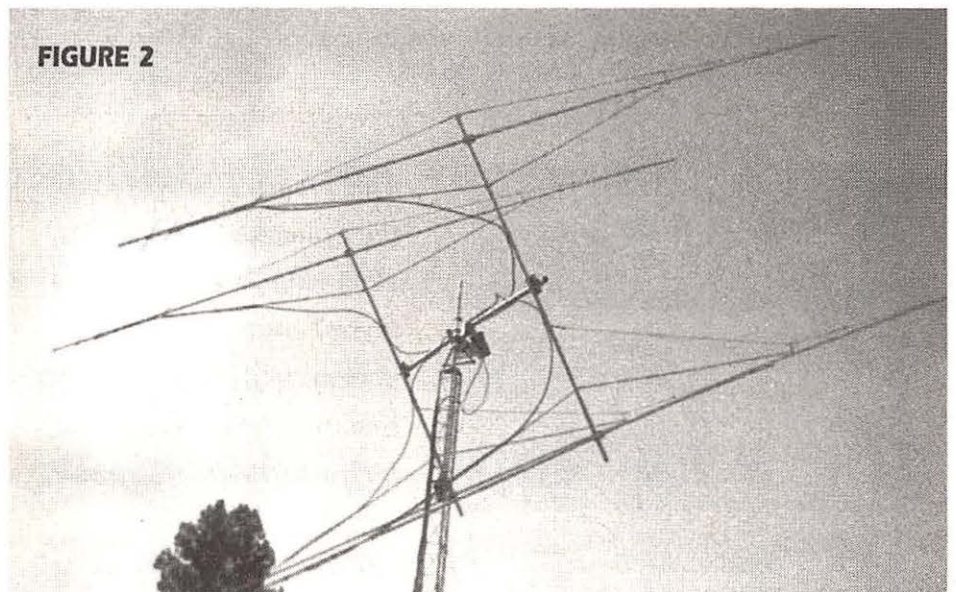
Although Shep's six-meter beam (fig. 1) is

capable of bare-bones type EME contacts, it is used mainly for tropo-duct, aurora, and sporadic-E work. Its eleven elements give it 12.5 dBd of gain. It is aimed at the horizon, and is equipped with a rotator which can point it to any direction of the compass. By mounting the beam 52 ft. high, Shep takes advantage of approximately four dB of "ground gain," (due to ground reflections adding to the beam's pattern), giving the installation a total of about 16 dBd—the minimum for EME work on that band.

Using this beam Shep has earned WAS (worked all states), WAC (worked all continents), 56 DXCC (DX Century Club) countries, and 602 grids to earn VUCC (VHF/UHF Century Club) #134. In addition he was the first station to work Europe via EME on 6 meters single Yagi-Uda to single-Yagi-Uda!

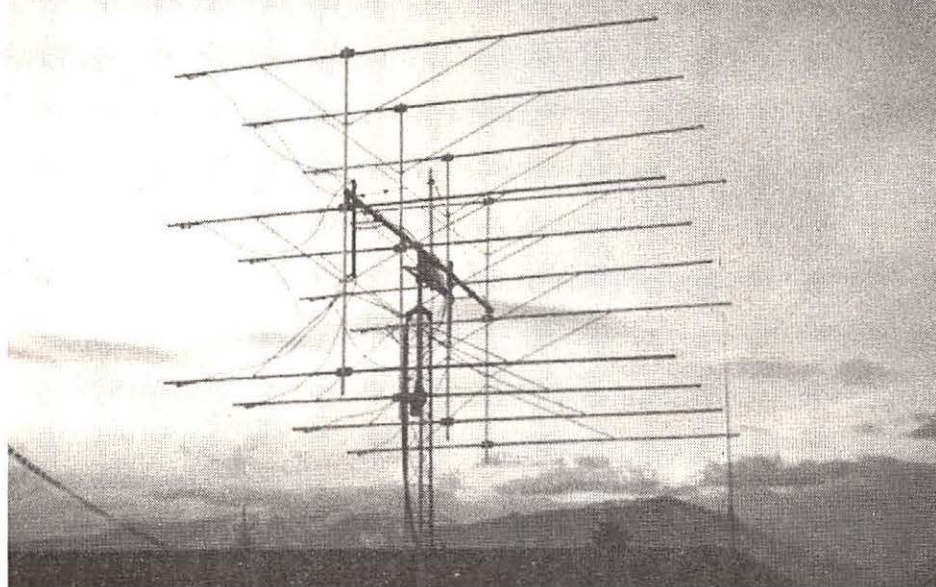
Shep's two-meter array (fig. 2) which is mounted 30 feet above ground, has four individual Yagi-Udas, with 19 elements each, giving it 21.5 dBd gain. This array gives excellent service with tropo ducting, sporadic-E, aurora, and EME work. With this antenna Shep has worked WAS (he was #67 to

FIGURE 2



W7HAH's two-meter, weak-signal array.

FIGURE 3



W7HAH's 432 MHz, weak-signal array.

do it on two-meters), WAC, 80 DXCC countries and 422 grids to earn VUCC #98.

To facilitate aiming the antenna at the moon it has two rotators: one for vertical orientation and one for horizontal rotation. In order to accurately aim the antenna at the moon Shep utilizes a computer program which gives him the azimuth (horizontal direction) and elevation (vertical direction) bearings for the moon at the time when he will be engaged in his EME communications.

The 432 MHz array at Shep's installation (fig. 3) is composed of 12 Yagi-Udas, each having 24 elements, giving it approximately 26 dBd gain. Both of Shep's arrays are fed with 7/8 inch heliax. Using the 432 MHz array Shep has worked 46 states, 35 DXCC countries and 160 grids to earn VUCC #111.

Thanks, Shep, for sharing your antennas with us.

RADIO RIDDLES

Last month:

I said: "Should you agree with me if I were to claim that every antenna is both a receiving antenna and a transmitting antenna, or, worse yet, that every exposed conductor is both a receiving and a transmitting antenna?"

Well, you should agree, because any electrical conductor can accept electromagnetic waves (radio waves) which impinge on it. Now, once it is conducting these waves, the

conductor doesn't know it isn't made to be an antenna just because its constructed to be a refrigerator door, a nail, a length of house wiring, or whatever.

And, once it receives a radio wave, it doesn't know whether it is supposed to pass that energy on to a load, burn it up in its ohmic resistance, or transmit it. Therefore, it does all of these that it finds possible: It burns some wave energy in its ohms, passes some on to a load if one is attached, and re-radiates what energy is left to its near field and far field. This is true of every conductor exposed to radio waves. It is even true of you as you sit monitoring those very waves that continually impinge upon every exposed conductor in this world, including our own little bodies!

This Month:

In the demanding constraints of EME work even 1 or 2 dB can sometimes make a significant difference in your chances for successful communications. The six-meter antenna system discussed above gives 16 dBd gain sending a signal to the moon, and 16 dBd receiving a returning signal. This gives 32 dBd path gain. How then can we successfully use this antenna, or even the higher-gain antennas discussed above, in EME work where we must overcome a path loss of over 250 dB?

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

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new requirements. The Yupiteru MVT-7100 does not pass either, nor does the 7200, which was introduced in the UK in the fall of 1995. The 7200 is a modified 7100. The only differences are:

- 1) Flexible rubber antenna instead of metal telescoping type
- 2) Built in ferrite rod
- 3) 2.4 kHz filter for SSB
- 4) Narrow AM tuning step addition
- 5) Wide FM tuning step addition.

"As we know, Yupiterus have been excluded from the US, but are available elsewhere, including Canada. Yupiteru is expected to introduce new models this year, but so far this has not happened. It is conceivable that if they continue to be excluded from the large U.S. market they may give up and leave the pickings to Uniden (or their licensees).

"We need a Ralph Nader of the scanner world: the technology is here today to make a handheld scanner with proper selectivity and shape for SSB, AM (wide and narrow), FM (wide and narrow), better internal shielding, vastly superior dynamic range, etc. So what if it is a little bigger, a little heavier, and a little more expensive? The AR 8000 is already expensive; add to that the cost of restoring cellular, computer readiness, etc, and replacing crystals, filters, and where are we? These 'mods' are much better done in the factory. Who is going to champion this cause?"

—Brian M. Moyse, Seabrook, TX

Fast Food Down Under

No, not kangaroos! Barry O'Grady compiled some of the fast food window frequencies used in Australia. In light of this month's fast food bonanza, we thought we'd share them with you.

30.48	30.58	30.82	30.84	33.14
35.02	40.41	40.49	51.8950	154.490
154.570	154.600	170.240	171.105	457.5125
457.525	457.5375	457.55	457.5625	457.6
460.8875	467.7375	467.75	467.7625	
467.775	467.7875	467.825		

He adds, "I have heard Hungry Jack's and Red Rooster on those frequencies; wireless mics on 36.7, 37.6 MHz; baby monitors on 30.4, 30.6, and 36.7 MHz. The cordless phone base frequencies here are: 30.075, 30.100, 30.125, 30.150, 30.175, 30.200, 30.225, 30.250, 30.275, 30.300 MHz. The corresponding handset frequencies are: 39.775, 39.800, 39.825, 39.850, 39.875, 39.900, 39.925, 39.950, 39.975, 40.000 MHz.

"There are also five older channels: 1.725, 1.740, 1.755, 1.770, 1.785 Base; 40.025, 40.075, 40.125, 40.225 handset.

"The corresponding channels in the U.S. are: 1.600, 1.700, 1.735, 1.760, 1.795 base; 49.830, 49.845, 49.875, 49.890 handset."

The above information was forwarded to us by Robert Eisner, one of the major contributors to this month's massive collection of fast food frequencies!

Same Scam; New Twist?

In February and again this month, Bob Grove closes out the issue with "The Scam That Wouldn't Die." Greg Doerschler (gkd@wpi.edu) sent another one which sounds uncannily like a rewording of the pitch for using your house wiring as a TV antenna.

"Instead of 'Turn your house wiring into a giant TV antenna,' this one reads 'Turn Your Car into a Giant All-Band Antenna!' Rather than claiming 'Your TV will suddenly display a sharp focused picture...', it boasts 'Imagine: strong, clear continuous frequency coverage of shortwave and scanner signals...'

"While neither ad provides any technical data to support such remarkable claims, at least this one doesn't brag about using my car's 100 horsepower to give me static-free reception. Still, 'Ideal for city dwellers...' sounds enough like 'Great for strong signal areas' to raise the question of whether this is another ad targeted at those 'suckers born every minute.'

"Thanks to Bob's timely warning, we can rest assured that *MT* subscribers at least will approach this product with due suspicion."

Not Expired

"Computers & Radio" columnist John Catalano thought he was being clever when he used Bob Grove, WA4PYQ, as the guinea pig to test HamCall's amateur radio database search results. However, sharp-eyed reader Ralph "Buddy" Fowee, KE4CVF, pointed out "It is wrong ... Bob Grove would not let his ticket expire!"

Sure enough—Bob Grove's expiration date was shown in the July *MT* as Dec 1995. Quickly, we broke open the just-released CD from HamCall and breathed a sigh of relief. Using the April 96 FCC database, it says Bob's good to go until October 2005!

From the Editor

"Personal Communications" is becoming a new buzzword in emerging technology, even though the term has yet to be fully defined. The use of such a catch-all phrase is well justified: communications systems are

becoming such a combination of old, new, and as-yet-undeveloped technology, that it is limiting to erect artificial barriers. In fact, we feel we've been on the track all along in our comprehensive coverage of radio — and we intend to stay there. So welcome to your PCS source — it was *MT* all along!

Sure, there will be some changes along the way. One of the first changes you're going to see, though, has nothing to do with content. Costs have risen so dramatically on all aspects of the production and mailing of a printed publication that we have to adjust somewhere. Beginning with the next issue, *MT* will no longer be enclosed in a polybag for those who receive the magazine through the mail.

As always, if you don't receive your issue by the 10th of the month, call and we'll replace it for you. Renewal reminders will no longer be a blow-in card, but some other means of notification. However, any time you want to know your expiration date, just look at your label on the magazine!

As always, we welcome your comments. What's the missing link in your personal communications system? What kind of information is most valuable to you, whether in your business or in your hobby? What's your favorite broadcast listening? It's important to us as your personal source for communications information.

—Rachel Baughn, mteditor@grove.net

Send Letters to the Editor via e-mail or to PO Box 98, Brasstown, NC 28902. Letters may be edited for brevity and clarity.

Note on advertisement below: As of 4/26/95 it became unlawful to market cellular-capable receivers in the US. Radio Progressive assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.

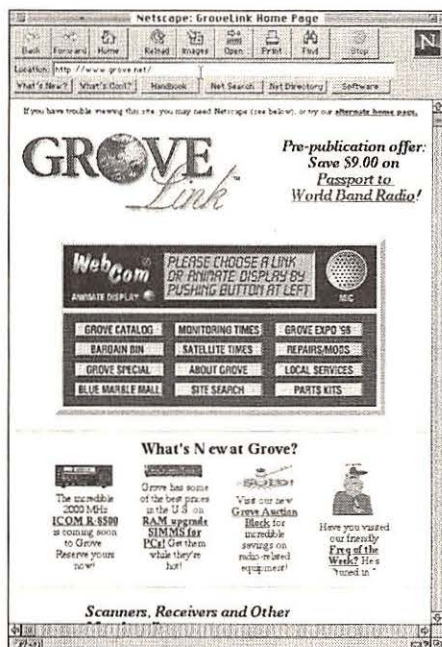
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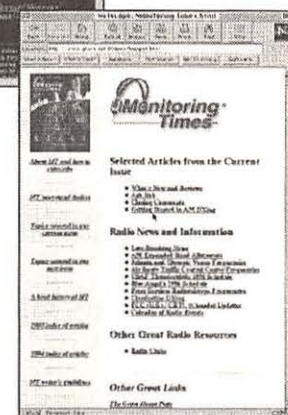
Here you will find the entire Grove Catalog on-line, as well as Grove Specials, the Grove Auction and Bob's Bargain Bin (new, used and returned merchandise at great prices). A special treat is Grove's new Blue Marble Mall, where you can find merchandise and services be-

yond the realm of radio (for example, did you know that Grove is now sole distributor of an advanced hearing aid available only by mail order?)

Certainly, many of you know us through our two magazines, *Monitoring Times* and *Satellite Times*. Come to their pages on the web to catch up on late-breaking news and link to some of the best resources in the world of radio. Need a subscription? Check out some of our monthly columns and stories, then subscribe on-line. It's easy!

Of course, we also have tons of information about the 1996 Grove Communications Expo in Atlanta (don't miss it—it's bigger and better than ever!) And we offer descriptions of a number of services we offer, such as scanner modification services, and even web page design (yes, that's right, we are an Internet service provider, too).

Grove is lots of things to lots of people, and our efforts on the Internet just prove that we never quit trying to earn your business and your trust.



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SWLing in the Early Forties

By A.W. Edwards, K5CN

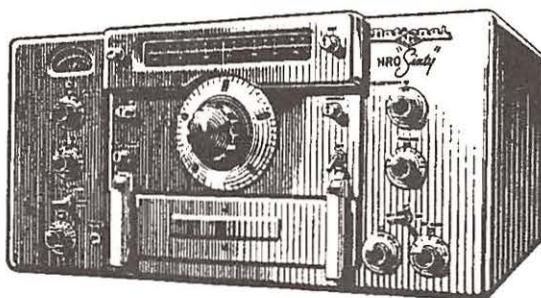
While idly tuning across some shortwave frequencies recently, identifying most, wondering at other signals, I was suddenly overcome by a realization of how, long ago, some kind of magical "age of innocence" had come and gone.

To begin with, today's shortwave receivers are such fine electronic marvels! Unless one lived in the era that we old-timers did, the contrast and comparisons are impossible. That is why I wanted to write this piece. What really brought this home to me was a quick recollection of the signal environment in the two eras. There just is hardly any basis for comparison—I know! Progress is progress, and I have no regrets. But nostalgia is also nostalgia, and in that I found a compelling reason to set some things down for you fortunate hobbyists of today.

■ The stuff listening was made of ...

Given normal propagation on any given day, the shortwave bands today are alive, writhing with signal activity. It is like looking into a big can of fishing worms—so many, so intertwined. The number and type of services carried is high, and many are very complex and diverse.

In the period I am writing of—1935 to 1942, to give it a time bracket—two main communications classes dominated the airwaves: amplitude modulation signals for voice transmissions, mostly commercial or international broadcast; and telegraphic Morse signals for marine, press, and other business



Tube-type receivers such as this National HRO-60 were state of the art for the times..

services. Aside from a few early radioteletype and facsimile signals, these were about all the transmission classes you might find in the 3-30 MHz range.

These few types of signals were uncrowded along the dial. You could hear HCJB, Quito, Ecuador, as well as if it were a local broadcast station, for example, and of course the mysterious ticks and tones of WWV.

The amateur bands offered a variety of interesting monitoring possibilities. Twenty-meter radiotelephone conversations were fascinating in days when a landlocked kid in Kansas could listen to a Floridian ham who was talking to a Canadian, for example. What a thrill!

In the evenings, conversations were always easy to find and hear on 70- and 260-meter amateur radiotelephone. I remember once copying down a cookie recipe that one ham's wife was passing along to another's. I gave them to my own mom, and we named them "Radio Cookies." Now and then, mom would make me a batch of them.

When World War II began, all the hams were ordered off the air. Listening could be interesting if you lived in range of a military or an air base and could tune in to the operational traffic. Once I intercepted a strong signal sending Morse code in German. I was only 15 at the time, and while I did not know what it said, I knew it was German. From its strength it was not very far away from my home on the coast of the Gulf of Mexico. I believe it was from a U-Boat. Torpedoing of ships had happened uncomfortably near to the United States' coastlines in these desperate early days of the war.

■ A few steps above a tin can ...

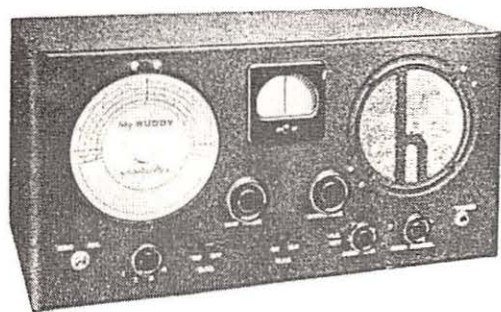
Quality receivers dedicated to shortwave reception were far too expensive for the ordinary person. The beginning SWLer usually either relied upon the family broadcast radio's shortwave bands—and some had quite good shortwave sections built in—or he might just build his own vacuum tube type receiver to get started. Almost invariably these were of the regenerative type, for their simplicity of construction. Building your own superheterodyne receiver was unthinkable. And all of them needed the longest, highest wire antenna you could manage to erect.

Hallicrafters entered the popular shortwave receiver market with a couple of relatively inexpensive entries. One was the "Sky Buddy," and the other, "Sky Champion." These were pretty good performers of the superheterodyne type. Hallicrafters also built expensive receivers, mostly for the military services, then.

Another popular old standby was National's SW-3. It was a regenerative receiver, well built, and came with a box full of coils to cover all the bands. One of them went to the South Pole with Admiral Byrd, and helped to provide communications back to the U.S.

To give you an idea of calibration problems: the SW-3's main tuning dial was a logging type, indicating only the numbers 0-100, from one end of the tuning range to the other. This scale applied to all the coils you had to plug in, so you had to do some astute record keeping and finagling with each set of coils to have any idea where you were, in terms of the radio frequency.

Especially by today's standards, all of these sets were unstable until after warmup. Even then, a shock or vibration of any kind would send them wandering off frequency, especially in the higher bands. In some of the models mentioned, vibrations generated interesting sounds ("microphonics") in the loudspeaker. This happened when a vacuum tube whose innards were not rigidly fastened acted as a microphone. If you tapped it, it would sort of ring, or chime. Sometimes, if you spoke loudly right over the defective



Hallicrafters "Sky Buddy" photo courtesy of Communications Receivers by Raymond S. Moore.

tube, your voice would come amplified out of the loudspeaker.

Frequency drift, calibration uncertainty, and sensitivities were always a concern, and were the kind of things we learned to deal with, the state of the art being what it was. But if the equipment had its shortcomings, guess what? It matched the available signal environment pretty well, anyway! The receivers, with their BFO and "bandspread" (fine tuning) controls could pretty well handle the broad signals on the air. So, not knowing we did not have sophisticated stuff, we copied unsophisticated stuff and had a ball!

■ You call this portable ... ?!

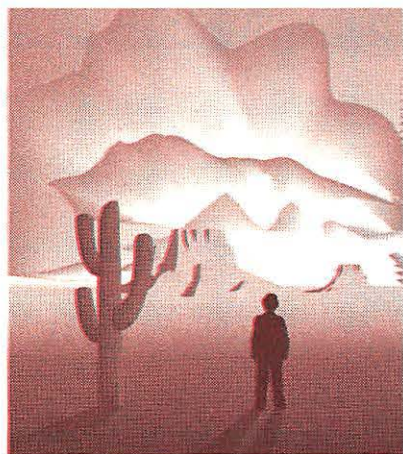
If you wanted a portable radio, you had to lug three to five pounds (more in larger models) of dry cell batteries along with the weight of the set itself. The "A" battery lighted the tube filaments, and the "B" battery furnished

operating voltage. You could depend upon one or both of them to run down at some critical listening point, and always too soon. Replacements were not cheap.

Today's marketplace for shortwave receivers is chock full of choices. It is actually hard to find a bad radio receiver, whether it is a true portable or for home use only. All of them are incredibly stable, accurate, sensitive (you get the world on a small rod antenna!) with special features like memories and built-in clocks that keep excellent time over months. They are light in weight, sound good, are practically impervious to damage, and are easy on batteries—which are not the monsters of those ancient days.

The best reason I can think of for treasuring those olden days is that the experience permits me to appreciate—so very much—the advances in the exciting hobby of monitoring the shortwave bands.

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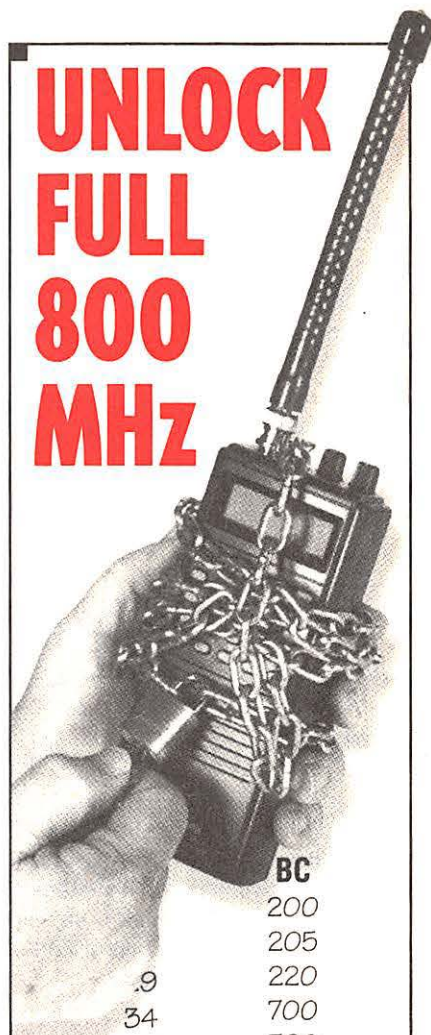
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Q. Does anyone manufacture preprogrammed memory chips for communications receivers? (Terrynce Ondola, Norwood, OH)

A. No. Broadcasting frequencies and schedules change too often, and there are tens of thousands of utilities communicators, so pre-programming those would be no better than simply turning the tuning dial on the radio.

Q. What are those large, colorful "basketballs" I see hanging from high tension power lines for? Even my electrician friends don't know. (Mark Burns)

A. That's because they have nothing to do with electricity. At one time I pondered whether these were used to keep squirrels away, to keep the lines from shorting out in the wind, or to keep the lines from vibrating loose. I was wrong. They are used to keep pilots from running into them!

Q. Would an aircraft antenna work better on aircraft monitoring than a standard scanner antenna? (Chris Fix, Stevens Point, WI)

A. Marginally. In most cases, you probably won't hear any improvement over a well-made, multiband, scanner antenna like the Grove ScanTenna.

Q. Why aren't laser weapons used in warfare instead of bombs and missiles? (Robert Brock, Phoenix, AZ)

A. For several reasons. First, the the smoke of a skirmish would diffuse their effectiveness; second, they require enormous power supplies making them impractical as tactical weapons; third, they are limited to line of sight; fourth, an obvious defense is a simple reflector.

Q. I recently purchased a scanner with CTCSS; what does that mean? (Chris Fix, Stevens Point, WI)

A. Continuous Tone Controlled Squelch System. In large radio systems where several departments share the same frequency, listening to each other's communications would be very disruptive. CTCSS, sometimes called subaudible tone, or PL (after Motorola's "Private Line"), is a method of sorting out the players.

In a CTCSS system, each set of common users—the members of one department who need to hear each other—are given a common tone which activates only their squelch. When other departments are on frequency, they have a different squelch tone which responds only to their members. Thus, the departments don't interfere with each other.

Q. I have an old shortwave receiver with a strip of three screws on the

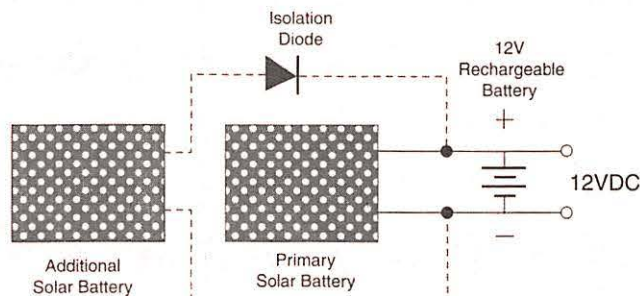
Revisiting Solar Batteries

It has been a while since the photovoltaic (solar battery) craze of the '70s and '80s, but the technology is still with us and improving constantly. Efficiency and durability are moving upward while size and cost are moving downward. At the Dayton Hamvention we decided to acquire a low cost solar battery to do some measurements. A 12 volt package seemed the most logical due to the variety of equipment and accessories available at that voltage.

Devices which would benefit from such an emergency, free power source include handy-talkies, hand-held scanners, QRP ham rigs, portable radio receivers, remote surveillance equipment, CBs, and survival transceivers.

An examination of the flea market area revealed that solar power panels were going for about \$5-\$7 per watt—the larger the panel, the better the deal. We decided to

Bob's Tips of the Month



check out a \$20 (plus \$5 shipping) 12" square panel from Disk-O-Mania, PO Box 7426, Romeoville, IL 60441-7426 (ph. 815-722-2570).

Setting the solar panel in bright sunlight, we measured an open terminal (unloaded) potential of 20 VDC; connected to 50 ohm resistive load, the array delivered 250 milliamps of current at 12 VDC. Heavier current would be delivered at proportionately lower voltages. Simple math ($watts = volts \times amps$), quickly revealed that this was a 3 watt panel. Naturally, the power will vary with solar intensity, and the panel doesn't work well at all at night!

All practical photovoltaic panels are

used in conjunction with NiCd or lead-acid gell cell rechargeable batteries (see figure); this permits the battery to store unused energy which may be tapped at night, and permits larger surges over short periods which would not be possible directly from the solar device. At night, the battery loses about 10 milliamps of current back into the solar battery if left connected.

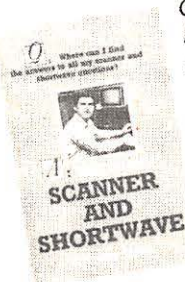
Higher power levels are obtained by cascading combinations of identical arrays. In that case, an inexpensive isolation diode (1N4001 or equivalent) should be placed in series with each parallel panel to prevent wasteful discharge of one panel into the other.

back for attachment of an antenna; they are market "A1," "A2," and "G." What kind of antenna line needs to be attached? (William Stibgen, Horsham, PA)

A. Years ago, it was common for antennas to be connected to a receiver via a single wire (random wire feed), or through TV-type twin lead (balanced feed). The twin lead would be connected to antenna screws A1 and A2, with a ground wire going to G. For either single wire feed or coax feed, connect a short jumper wire between A2 and G; then attach the single wire or coax center conductor to A1, and a ground wire as before (and the coax braid) to G.

Questions or tips sent to "Ask Bob," c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bob@grove.net. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: www.grove.net

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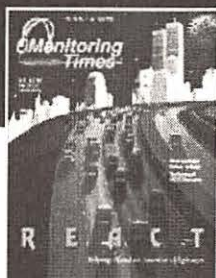
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By Bob Grove,
Publisher

Random Reflections

The Peter Principle revisited: A working group preparing for the next World Administrative Radio Conference (WARC '97) has already heard from thousands of irate radio amateurs who learned that the group was considering turning over the signal-saturated 2 meter (144-148 MHz) and 70 centimeter (420-450 MHz) bands to low earth orbiting (little LEO) satellite investors. Removed from consideration was 175 megahertz of largely neglected spectrum between 225-400 MHz. Were there no technical qualifications for this team?

For more details, see my editorial in the July-August issue of *Satellite Times* and the ARRL web page. Comments by e-mail may be sent to: wrc97@fcc.gov. Written comments, with an original plus one copy, should be sent to: Office of the Secretary, Federal Communications Commission, Washington, DC 20554. Each comment should include at the top, "Reference No. ISP-96-005" and "Advisory Committee Informal Working Group 2A."

Keyless Entry Systems: It occurs to me that, in spite of the theoretically large number of possible codes for keyless automobile door locks, odds are favorable that you could drive around a large shopping mall, pressing your own key-ring remote, listening for the tell-tale "beep" of a responding parked vehicle, ripe for ripoff. Garage door openers, too, have a finite number of settings.

Since all of these devices operate in the 300-400 MHz range, why couldn't a thief stake out a house or car, using a wideband detector to record the encoded pulse audio, and a storage spectrum analyzer to spot the brief radio frequency when the owner presses his remote control? When the owner is away, the interloper could transmit on that frequency using a small oscillator or signal generator modulated by the recorded pulse tone to gain entry.

I think I'll go back to a manual key lock.

Quackery Redux: *MT* readers know by now that I am fascinated by techno-quackery; I collect quack medical devices and am writing a book on them. I also uncharitably expose vendors who, whether through ignorance, intent, or apathy, promote hucksterism in their advertising. You frequently send me grist for the mill.

It seems from the weight of mail that the current king of bogus contraptions is the "Power Tip," a mythical signal-enhancing scheme "Battle proven in Desert Storm." I've never seen such a concentration of deception in one ad:

The crooked contrivance "Revolutionizes reception of radios, TVs and portable phones," "intensifies radio signals...increases reception range and clarity by phasing out annoying and interrupting static" while giving "older equipment new life." And it needs no electricity or batteries!. The plastic pea contains a piece of copper that does all this and more, according to the unconscionable pitchsters.

Finally, the humbug that won't go away is the "turn your house wiring into a giant antenna" hoax. Consisting of nothing more than voltage-blocking capacitors, these nightmare devices invite all the electrical noise in your home to visit your radio or TV by direct connection, while denying the successful reception which comes from a real antenna.

Of course, they require no batteries or other source of power, but then neither does a paper clip.

High Court Rejects Decency Act: A federal court has rejected the proposed Communications Decency Act, an effort by Congress to regulated the contents of the electronic media with special emphasis on the Internet. The court cited the proposal as being unduly restrictive on the Constitutional First Amendment guarantee of the Right to Free Speech.

This is a bittersweet defeat. While few would deny the inalienable right of Americans to express their views, many feel that this right implies an open invitation to abuse. The matter boils down to the endless debate between censorship and good taste. The issue will now be appealed to the Supreme Court.



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